Open Access

Original Article

Effects of Iyengar Yoga on Pelvic Floor Muscle Strength and Endurance among Young Females with Stress Urinary Incontinence

Sadia Shafaq, Amna Aamir Khan*, Musarrat Kazi

Metropolis Health Hospital, Karachi Pakistan, *Ziauddin University, Karachi Pakistan

ABSTRACT

Objectives: To determine the effects of yoga therapy on pelvic floor muscle strength, endurance, and health-related quality of life in young women with stress urinary incontinence.

Study Design: Interventional study (ClinicalTrials.gov Identifier: NCT04428853).

Place and Duration of Study: Rehabilitation Department, Secondary Care Hospital, Karachi Pakistan, from Aug 2020 and Mar 2021.

Methodology: A total of 44 young married females aged between 17 and 40 years, diagnosed with stress urinary incontinence due to pelvic floor muscle weakness, were included. Perineometer was used to assess the strength and endurance of pelvic floor muscles. In addition, the International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form (ICIQ-UI SF) was used to assess the impact of incontinence symptoms on quality of life and the outcome of treatment at baseline and after eight weeks of intervention.

Results: Iyengar yoga significantly improved pelvic floor strength and endurance. There was statistically significance the impact of Iyengar yoga on pelvic floor muscle strength for the endurance of pelvic floor musculature ($p < 0.001$). Similarly, Iyengar yoga was also found significantly effective in decreasing frequency, severity and overall quality of life (QoL) by improving scores of ICIQ-UI-SF questionnaires showing a pre-post mean difference of 10 ($p < 0.001$).

Conclusion: The current study indicated the important role of yoga in improving pelvic muscle strength and endurance and decreasing urinary incontinence symptoms and distress hence improving the quality of life.

Keywords: Endurance, Iyengar yoga, Pelvic strength, Quality of life, Urinary incontinence.

How to Cite This Article: *Shafaq S, Khan AA, Kazi M. Effects of Iyengar Yoga on Pelvic Floor Muscle Strength and Endurance among Young Females with Stress Urinary Incontinence. Pak Armed Forces Med J 2022; 72(5): 1518-1521. DOI: https://doi.org/10.51253/pafmj.v72i5.7691*

INTRODUCTION

Stress Urinary Incontinence (SUI) is global health problem predominantly prevalent among young post-partum females complaining of involun-tary urine leakage due to exertion or sneezing.[1] The statistical data on SUI is scarce as the condition has failed to be reported among young and older females due to cultural norms of privacy, embarrassment or belief of being untreated.[2] National Statistics estimates the prevalence of SUI among young females aged 17-40 years was 45.3%, increasing the social and psychological burden of society.[3] Moreover, it also affects confidence and self-respect, personal relationships, ceases employment, and increases dependence on caregivers limiting activities of daily living.[4]

The prevalence of SUI among women with normal vaginal deliveries and cesareans is approximately 55% and 40%, respectively.[5] However, the actual prevalence of SUI is difficult to determine due to a lack of documentation by the health care provider.[4] Indeed, 77% of females in the sub-Saharan region were reluctant to consult the practitioners.[6] Furthermore, on average, only 29% of women seek medical advice for UI in Taiwan, thus, highlighting the severity of the condition.[7]

Several treatment options, including drugs and surgery, are implemented for treating incontinence, but their accessibility, safety, efficacy and sustainability limit the utilization by the healthcare practitioner. Literature has shown that behavioural interventional strategies, including bladder training, pelvic floor muscle exercises, and biofeedback mechanisms, are commonly practised by physical therapists in treating SUI. However, the scope remains limited due to poor compliance by patients.[8] Yoga potentially improves incontinence symptoms by addressing individual muscle groups and by promoting awareness of body alignment incorporating breathing and mindful meditation to reduce anxiety, and stress, improving balance and muscle strength that have been identified as common problems associated with incontinence in women.[9] Iyengar Yoga incorporates distinctive supportive props and a strictly designed sequence of postures and poses that impact the medical conditions of an individual. Furthermore, the core concept of the Iyengar

Correspondence: Dr Sadia Shafaq, Department of Rehabilitation, Metropolis Health Hospital, Karachi, Pakistan

Received: 19 Nov 2021; revision received: 20 Jan 2022; accepted: 24 Jan 2022

yoga poses consist of appropriate preparation for inversions and backward extensions that encodes the avoidance of neural tissue irritability to assure strict practice of asanas producing body warmth, stimulus, energy and activation of vitality accompanied with the asanas that induce coolness, relaxation and calmness.[10] Hence, to identify the feasibility, safety, and efficacy of yoga as an Adjuvant treatment option for incontinence, we conducted an 8-week group-based yoga therapy program in young-age women to determine the effects of Iyengar yoga therapy on pelvic floor muscle strength and endurance and health-related quality of life in young women with stress urinary incontinence.

METHODOLOGY

This interventional study (ClinicalTrials.gov Identifier: NCT04428853) was conducted at the Yoga classroom of the Rehabilitation Department, Secondary Care Hospital, Karachi Pakistan, from August 2020 and March 2021. Ethical approval from the Institutional Review Board of Ziauddin University, Karachi, Pakistan, was obtained prior to the study (1581119-SSPT). The study was registered by the National Clinical Trial Registry, US National library of medicine. The non-probability convenience sampling technique was used to recruit participants.

The sample size for this study was calculated using OpenEpi version 3.01. The mean incontinence at baseline was taken at 2.5 (1.3), while after yoga intervention, the incontinence reduced to 1.8(0.9) episodes/day.[11] By keeping the confidence level of 95% and the power of the test at 80%, a sample size of 44 was determined.

Inclusion Criteria: Young married females aged between 17 to 40 years, diagnosed with stress urinary incontinence due to pelvic floor muscle weakness by gynaecologists and urologists were included in the study.

Exclusion Criteria: Females with an active urinary tract infection (UTI) or hematuria at the time of data collection, those who were pregnant, or taking any pharmacological treatment for urinary incontinence were excluded from the study.

All subjects were required to sign a consent form of participation and were ensured confidentiality and anonymity. Before commencing yoga therapy, members were provided with a one-hour orientation that included Iyengar yoga concepts, effectiveness, and prop use. Next, the researcher devised a regimen for the participant's group yoga therapy twice a week. Each session lasts 75 minutes and is conducted by a certified yoga instructor and an assistant over eight weeks. Participants were also encouraged to perform yoga at home for an additional day each week and to keep track of the dates and length of time they spent doing so. Finally, participants were given a guidebook with detailed descriptions in both English and Urdu and photographs depicting the fundamental yoga postures taught in the workshops. The manual also included instructions on how to do each posture easily and securely and how to alter each stance to address incontinence and enhance pelvic floor function.

The Iyengar Yoga Therapy regimen consisted of two days of supervised group yoga courses and one day of home yoga conducted once a week for eight weeks. The sessions lasted 75 minutes each. There were five stages to this protocol; 1) a warm-up session 2) Pranayamas (breathing exercises), 3) the active Phase, 4) the restorative phase, and 5) meditation.[12]

A warm-up session was carried out for 10 minutes with steady movement and breathing to raise core body temperature, lubricate joints, integrate mind, body, and spirit, and promote blood circulation. Participants executed four different postures under the guidance of expert yoga therapists: cat/cow, wag the tail, thoracic rotation, and rock backs. Each posture was held for 5-10 breaths before being repeated.[9] This phase had two types of breathing patterns, one of which being Bhramari breathing. This was done five times with a ten-second hold and Nadi Shodhana breathing. This was done ten times with a ten-second hold in between.

The active phase concentrated on 12 Asanas performed in standing, sitting, and supine postures and directly targeted the pelvic floor muscles. Participants were instructed to do Trikonasana, Parsvakonasana, Tadasana, Parsvottanasana, Virabhadrasana-II, Utkatasana; in sitting postures, Bharadvajasana, Malasana, Baddha Konasana; and in supine postures, Supta Padangusthasana, Supta Badd.

All of the asanas were repeated five times each. Participants held each yoga stance for 15 seconds, with a 30-second rest interval between each yoga posture.

During this phase, the emphasis was on postures that rejuvenated the body, mind, and spirit while relieving stress and tension in the body. Viparita Karani Variation and Savasana are the two postures that make up this set. Participants must hold each posture for a minimum of 4-5 minutes. Then, for 10 minutes,

meditate with soothing music, guided by breath and mental awareness of the entire body.

Yoga sessions were terminated on the occurrence of severe headache, dizziness, abnormal heart rate response, joint pain, or any discomfort to the participant. Perineometer was used to assess the strength and endurance of pelvic floor muscles. In addition, the World Health Organization developed a brief questionnaire ICIQ-UI SF to assess the impact of symptoms of incontinence on quality of life and the outcome of treatment both at baseline and after eight weeks of intervention.

Statistical Package for Social Sciences (SPSS) version 23.0 was used for the data analysis. Kolmogorov–Smirnov test and the Shapiro–Wilk test were applied to check the normality of the data. As the data found deviated from the normal distribution, the Wilcoxon signed-rank test was used to determine the difference between pre-post interventions. The *p*-value lower than or up to 0.05 was considered as significant.

RESULTS

A total of 44 young married females were included in the study. The mean age of participants was 27.34±4.63 years, with a mean body mass index of 22.45±1.9 kg/m^2 (Table-I).

Table-I: Participant Characteristics (n=44)

Characteristic	Mean±SD
Age (years)	27.34±4.63
Body Mass Index (kg/m2)	22.45±1.90
Gravidity	2.36±1.08
Parity	2.25±1.06
Normal Vaginal Delivery	1.07±1.19
C-Section	1.16±1.01
Gynecological Surgery	1.95±0.21

Upon further assessment, it was found that Iyengar yoga significantly improved pelvic floor strength and endurance. The baseline values of strength and endurance at the time of participation were 19.27 (16.59-22.49) and 5 (5-6), respectively, which increased to 41.4 (36.52-45.15) and 9 (8-10), respectively, (*p*-value <0.0001).

Iyengar yoga significantly improved pelvic floor strength and endurance. There was statistically significance the impact of Iyengar yoga on pelvic floor muscle strength for the endurance of pelvic floor musculature with $p<0.001$.

Similarly, Iyengar yoga was also found significantly effective in decreasing frequency, severity and overall quality of life (QoL) by improving scores of ICIQ-UI-SF questionnaires showing a pre-post mean difference of 10 ($p<0.001$) as depicted in Table-II.

Table-II: Change in Pelvic Strength, Endurance, and Quality of Life (n=44)

Parameters	Study Groups		*p*-value
	Group-A (n=44)	Group-B (n=44)	
Pelvic floor strength	19.27 (16.59-22.49)	41.4 (36.52-45.15)	<0.001
Pelvic floor endurance	5 (5-6)	9 (8-10)	<0.001
ICIQ-UI-SF	14 (12-16)	4 (3-5)	<0.001

DISCUSSION

We enrolled females diagnosed with urinary stress incontinence for an eight-week-long yoga intervention therapy. Our study aimed to evaluate its efficacy in improving the symptoms and patients' well-being. The current study indicates that Iyengar yoga considerably improved pelvic muscle strength, endurance, and patient quality of life.

Increasing pelvic floor muscle strength has been considered the main objective in treating stress urinary incontinence as per the first international initial consultation in 1998.[12] Hence, identifying feasible and cost-efficient treatment options are the next goal. Multiple behavioural therapies have been introduced as lifestyle modifications. Engaging in physical activities, be it of any sort ranging from aerobics to yoga, has significantly increased pelvic muscle strength in females.[13] Yet another study concluded the weakening of pelvic muscles in women doing strenuous exercise.[14]

In recent times yoga-based and similar physical therapies have proved to play an important role in strengthening pelvic muscles and improving overall health.[15] Apart from this, yoga may play a crucial role in helping patients of both genders to overcome acute and chronic health problems of all forms, ranging from depression, stress and anxiety to back pain.[16] In a randomized trial conducted by Huang *et al.* in 2014, women enrolled in a supervised 6-week yoga program reported a 66% decrease in the frequency of their incontinence symptoms compared to their baseline.[17] Another study conducted by Huang *et al.* in 2018 provides preliminary evidence in reducing urinary and stress-type incontinence over a three-month yoga practice.[18] However, yoga is a complex intervention with many practice components which, if practiced incorrectly, may fail to produce its effects.

Hence some studies may fail to report any significant improvement in their symptom burden

load, which can be attributed to performance bias or imprecision in recording the results.[19] Another research by Bø *et al*. fails to correlate multiple exercise routines to improved pelvic muscle strength.[20]

However, yoga has been a supplementary treatment for decreasing incontinence symptoms severity in some settings.[21] Hence, encouraging patients and guiding them to be a part of such groups alongside pharmacologic therapy can help them improve their symptoms, if not cured and improve their overall health. However, some females may still fail to comply with this, which is rooted in their limited access to healthcare facilities and the lack of social and family support. In contrast, some females may remain unaware of these problems and their treatment owing to their lack of knowledge and education.

ACKNOWLEDGEMENT

We want to thank all the participants who, despite their busy schedules, took time out for the study and demonstrated compliance throughout the intervention.

LIMITATIONS OF STUDY

The eight-week period was not enough to assess the long-term efficacy of yoga for improving pelvic strength and reducing urinary incontinence.

CONCLUSION

The current study indicated the powerful role of yoga in improving pelvic muscle strength and endurance and decreasing urinary incontinence symptoms and distress hence improving the quality of life.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

SS: Study design, data analysis, critical review, drafting the manuscript, critical review, approval of the final version to be published.

AAK: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

MK: Drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investi-gated and resolved.

REFERENCES

1. Gajewski JB, Schurch B, Hamid R, Averbeck M, Sakakibara R, Agrò EF. An International Continence Society (ICS) report on the terminology for adult neurogenic lower urinary tract dys-function (ANLUTD). Neurourol Urodyn 2018; 37(3): 1152-1161.
2. Frawley J, Sibbritt D, Steel A. Complementary and Conventional Health-care Utilization Among Young Australian Women With Urinary Incontinence. Urology 2017; 99(1): 92-99.
3. Gilani Z, Darain H, Aziz S, Orakzai MJ, Raheem L, Jabeen M. Prevalence of Urinary Incontinence in Postpartum Females in Hayatabad, Peshawar. J Islam Int Med Coll 2017; 12(2): 106-110.
4. Aoki Y, Brown HW, Brubaker L, Cornu JN, Daly JO. Urinary incontinence in women. Nat Rev Dis Primers 2017; 3(1):17042. doi: 10.1038/nrdp.2017.42. Erratum in: Nat Rev Dis Prim 2017; 3(1): 17097.
5. Fritel X, Ringa V, Quiboeuf E, Fauconnier A. Female urinary incontinence, from pregnancy to menopause: a review of epide-miological and pathophysiological findings. Acta Obstet Gynecol Scand 2012; 91(8): 901-910. doi: 10.1111/j.1600-0412.2012.01419.x.
6. Niang L, Kane R, Ndoye M. Incontinence urinaire de la femme: profil épidémiologique au sud du Sahara [Urinary incontinence in woman: epidemiologic profile in Sub Saharian countries]. Prog Urol 2010; 20(13): 1213-1216. French. doi: 10.1016/j.purol.2010.01.014.
7. Ngarambe C, Peng DH. Female urinary incontinence: a syste-matic overview and non-surgical treatment. Int J Reprod Contra-cept Obstet Gynecol 2015; 4(3): 527-540.
8. Dumoulin C, Cacciari LP, Hay-Smith EJC. Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women. Cochrane Database Syst Rev 2018; 10(10): CD005654. doi: 10.1002/14651858.CD005654.pub4.
9. Miller D. Yoga. InHealing in Urology: Clinical Guidebook to Herbal and Alternative Therapies. World Scientific;2016, [Internet] available at: https://www.amazon.com/Healing-Uro-logy Guide book-Alternative-Therapies/dp/B073L8Y7YH
10. Telles S, Sayal N, Nacht C, Chopra A, Patel K, Wnuk A, et al. Yoga: Can it be integrated with treatment of neuropathic pain? Ann Neurosci 2019; 26(2): 82-91. doi: 10.5214/ans.0972. 7531.260208.
11. Lim R, Liong ML, Lau YK, Yuen KH. Validity, reliability, and responsiveness of the ICIQ-UI SF and ICIQ-LUTSqol in the Malaysian population. Neurourol Urodyn 2017; 36(2): 438-442.
12. Woodley SJ, Lawrenson P, Boyle R, Cody JD, Mørkved S, Kernohan A, et al. Pelvic floor muscle training for preventing and treating urinary and faecal incontinence in antenatal and postnatal women. Cochrane Database Syst Rev 2020; 5(5): CD007471.
13. Gonçalves MLC, Fernandes S, Batista de Sousa J. Do moderate aerobic exercise and strength training influence electromyo-graphic biofeedback of the pelvic floor muscles in female non-athletes? J Phys Ther Sci 2018; 30(2): 313-319. doi: 10.1589/ jpts.30.313.
14. Dornowski M, Makar P, Sawicki P, Wilczyńska D, Vereshchaka I, Ossowski Z. Effects of low- vs high-volume swimming training on pelvic floor muscle activity in women. Biol Sport 2019; 36(1): 95-99. doi: 10.5114/biolsport.2018.78909.
15. Luan X, Tian X, Zhang H, Huang R, Li N, Chen P, et al. Exercise as a prescription for patients with various diseases. J Sport Health Sci 2019; 8(5): 422-441. doi: 10.1016/j.jshs.2019.04.002.
16. Prathikanti S, Rivera R, Cochran A, Tungol JG, Fayazmanesh N, Weinmann E. Treating major depression with yoga: A prospec-tive, randomized, controlled pilot trial. PLoS One 2017; 12(3): e0173869.
17. Huang AJ, Jenny HE, Chesney MA, Schembri M, Subak LL. A group-based yoga therapy intervention for urinary incontinence in women: a pilot randomized trial. Female Pelvic Med Reconstr Surg 2014; 20(3): 147-154. doi: 10.1097/SPV.0000000000000072.
18. Huang AJ, Chesney M, Lisha N, Vittinghoff E, Schembri M, Pawlowsky S, et al. A group-based yoga program for urinary incontinence in ambulatory women: feasibility, tolerability, and change in incontinence frequency over 3 months in a single-center randomized trial. Am J Obstet Gynecol 2019; 220(1): 87.e1-87.e13.
19. Wieland LS, Shrestha N, Lassi ZS.Yoga for treating urinary incontinence in women. Cochrane Database Syst Rev 2019; 2(2): CD012668. doi: 10.1002/ 14651858.CD012668.pub2.
20. Bø K, Herbert RD. There is not yet strong evidence that exercise regimens other than pelvic floor muscle training can reduce stress urinary incontinence in women: a systematic review. J Physiother 2013; 59(3): 159-168. doi: 10.1016/S1836-9553(13) 70180-2.
21. Tenfelde S, Tell D, Garfield L. Yoga for women with urgency urinary incontinence: A pilot study. Fe-male Pelvic Med Reconstr Surg 2021; 27(1): 57-62. doi:10.1097/ SPV.0000000000000723.