REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No. 1S (2024)
http://www.veterinaria.org
Article Received- Revised- Accepted-

Vinyasa Yoga Training Module: Effects on Muscular Endurance, Static Balance, and Flexibility in Yoga Practitioners

Shrikant[1], Nongmaithem Suhindar Singh[2], Rahul Kanojiya [3], Meriline Gogoi[4], Shankar Jyoti Basumatary[5], Abhishek Singh[6], Kshetrimayum Rojeet Singh[7*]

[1]Assistant Professor, Lakshmibai National Institute of Physical Education (NERC), Guwahati (Assam), India.
[2] Assistant Professor, Lakshmibai National Institute of Physical Education (NERC), Guwahati (Assam), India.
[3] Assistant Professor, Lakshmibai National Institute of Physical Education, Gwalior, (M.P), India.
[4] Assistant Professor, Lakshmibai National Institute of Physical Education (NERC), Guwahati (Assam), India.
[5]Associate Professor, Lakshmibai National Institute of Physical Education (NERC), Guwahati (Assam), India.
[6]Assistant Professor, Lakshmibai National Institute of Physical Education (NERC), Guwahati (Assam), India.
[7]*Assistant Professor, Department of Physical Education, Rajiv Gandhi University, Arunachal Pradesh, India.

***Corresponding Author:** Kshetrimayum Rojeet Singh
*E-mail: rojeet.singh007@gmail.com

Abstract: the aim of the studywas to examines the impact of Vinyasa yoga training module on the flexibility, muscular endurance, and balance of yoga practitioners.
Methodology: 20 yoga specialize subjects age ranging from 18 to 23 years were selected for the purpose of the present study. Further the subjects were divided in two experimental (10 subjects) and control groups (10 subjects).The pre-test and post-test randomised design was used where the experimental group underwent Vinyasa yoga training module while the control group maintained their regular yoga practice. Muscular endurance (Sit ups test for one minute), static balance (Sens balance test), and flexibility (Sit and reach) was measured before and after the treatment.
Results: The study's findings revealed substantial enhancement in all three selected dependent variables i.e. muscular endurance, static balance, and flexibility in the experimental group in comparison to the control group. The one-way analysis of covariance(ANCOVA) confirmed that those changes were statistically significant at 0.05 level, the study findings shown Vinyasa yoga training's beneficially influence on various physical fitness metrics.
Conclusions: Following systematic six weeks Vinyasa yoga module is an effective training method in enhancing physical fitness components critical to overall health and performance in yoga.

Keywords: Yoga, VYTM (Vinyasa Yoga Training Module), Flexibility, Muscular Endurance, Static Balance.

Introduction: Yoga, an ancient practice with roots in Indian philosophy, has evolved significantly over millennia, encompassing various styles and disciplines. Among these, Vinyasa yoga has gained substantial popularity for its dynamic approach, emphasizing fluid movement and synchronization of breath. This style, often described as a “flow” due to its continuous sequence of poses, integrates physical, mental, and spiritual aspects, offering a holistic approach to health and well-being (Feuerstein, 2003).Vinyasa yoga is characterized by a series of postures (asanas) performed in a sequence, linked by breath. This style contrasts with static forms of yoga, where poses are held for extended periods. In Vinyasa, each movement is coordinated with an inhalation or exhalation, creating a rhythmic and flowing practice (Payne & Usatine, 2002). This flow not only enhances the physical aspect of yoga but also incorporates a meditative quality, encouraging practitioners to remain present and focused.The term "Vinyasa" originates from Sanskrit, meaning "to place in a special way" (Telles et al., 2019). Vinyasa yoga is a kind of yoga that involves sequencing poses such that the practitioner may move breath-aware from one pose to the next (Ramaswami, 2005).As a philosophy, vinyasa recognises the transient nature of things. Originally, it described a set of actions to elevate anything to a sacred status by adopting a steady position, holding it for a little period of time, and then releasing it (Saal, 2019). Historically, Vinyasa yoga's roots can be traced back to the Vedic period, evolving through various schools of thought. Modern Vinyasa yoga, as popularized in the West, owes much to the teachings of Krishnamacharya and his students, notably K. Pattabhi Jois, who developed the Ashtanga Vinyasa Yoga system (Singleton, 2010). This system laid the foundation for many contemporary Vinyasa practices, emphasizing a structured yet flexible approach to sequencing poses.Vinyasa yoga, with its continuous flow of movements, provides an effective workout for enhancing muscular endurance. The transitions between poses require sustained muscle engagement, particularly in the core, legs, and arms (Cowen & Adams, 2005). Studies have demonstrated that regular Vinyasa practice can lead to significant improvements in muscle strength and endurance, contributing to overall physical fitness (Hagins et al., 2007). Vinyasa Yoga incorporates a variety of poses that require sustained muscle engagement, potentially enhancing muscular endurance (Cowen, 2010). The continuous flow from one pose to another, often holding positions such as plank or downward dog, challenges muscle groups and builds endurance over time. Balance is a crucial component of physical fitness, particularly as it pertains to the prevention of falls and maintenance of functional mobility. Vinyasa yoga incorporates a variety of poses that challenge

and enhance balance. Postures such as tree pose (Vrikshasana) and warrior III (Virabhadrasana III) require a stable centre of gravity and strong proprioceptive skills (Grabara & Szopa, 2015). Research indicates that yoga practitioners often exhibit superior balance and coordination compared to non-practitioners, highlighting the effectiveness of Vinyasa yoga in this area (Jeter et al., 2014). Studies have shown that regular practice of these postures can significantly improve balance and proprioception (Manjunath & Telles, 2001). This improvement is attributed to the engagement of stabilizing muscles and the development of a strong core.Flexibility, or the range of motion around a joint, is another key benefit of Vinyasa yoga. The flowing nature of the practice ensures that multiple muscle groups are stretched and lengthened. Poses such as downward-facing dog (Adho Mukha Svanasana) and forward bends (Uttanasana) target large muscle groups, enhancing flexibility in the hamstrings, spine, and shoulders (Cramer et al., 2016). Consistent practice of Vinyasa yoga has been shown to significantly improve flexibility, contributing to reduced muscle stiffness and injury prevention (Field, 2011). This style of yoga, often referred to as "flow" yoga, integrates breath and movement to create a seamless transition between poses. Practitioners of Vinyasa Yoga are believed to benefit from various physiological improvements, particularly in muscular endurance, balance, and flexibility (Woodyard, 2011).The benefits of Vinyasa yoga can be attributed to several underlying mechanisms. Firstly, the physical exertion involved in flowing sequences improves cardiovascular health and muscle function. The emphasis on breath control (pranayama) enhances lung capacity and respiratory efficiency. Secondly, the social component of practicing yoga in groups can foster a sense of community and support, contributing to overall well-being (Park et al., 2018).Current research on Vinyasa yoga has predominantly focused on its physical benefits, with emerging studies exploring its impact on mental health and cognitive function. Research revealed that yoga exercises are useful in developing balance and perception (Rayat, 2015). The findings imply that a regular yoga practice can improve male college players' balance and flexibility and so improves athletic performance (Polsgrove et al., 2016). Previous investigations states that vinyasa is a cost-effective and alternative training method; it can improve fitness and boost overall wellness (Tsopanidou et al., 2020). In a study, following six months of vinyasa training, females had changes in maximal muscle torque, as well as alterations in muscle topography (Buśko & Rychlik, 2006). Long-term vinyasa yoga-based programmes have shown enhancement in health-related fitness condition significantly (Boraczyński et al., 2020).This study investigates the effect of Vinyasa yoga training module on three specific physical fitness parameters: flexibility, muscular endurance, and static balance. Understanding these training module effects can be beneficial to yoga practitioners and instructors through regular systematic appliances of Vinyasa yoga into their routines.

Methodology: 20 yoga specialize subjects age ranging from 18 to 23 years were selected from the Lakshmibai National Institute of Physical Education, North East Regional Centre, Guwahati (Assam) for the purpose of the present study. Further the subjects were divided in two experimental (10 subjects) and control groups (10 subjects). The pre-test and post-test randomised design was used where the experimental group underwent Vinyasa yoga training module while the control group maintained their regular yoga practice. Muscular endurance (Sit ups test for one minute), static balance (SENS balance test), and flexibility (Sit and reach) was measured before and after the treatment. *Statistical analysis*: descriptive statistics was used to describe the collected data and for the comparison of Pre-test and post-test scores were analysed by using ANCOVA to determine the effectiveness of the Vinyasa Yoga training module.

Results: Table 3 presents descriptive statistics data for three dependent variables among yoga practitioners: muscular endurance, balance, and flexibility after training. The experimental group's results for muscular endurance were 44.90 ± 5.87, while the control group's results were 34.00 ± 5.75. The experimental group's results for static balance were 17.62 ± 5.74, and the control group's results were 14.01 ± 7.36. Finally, for flexibility, the experimental group's results were 25.43 ± 6.58, and the control group's results were 20.19 ± 8.16.

Table 3. **Descriptive statistics dependent variables: Muscular Endurance, Balance, and Flexibility after training**

Variables	Group	Mean	Std. Deviation	N
Muscular Endurance	Experimental	44.90	5.87	10
	Control	34.00	5.75	10
	Total	39.45	7.95	20
StaticBalance	Experimental	17.62	5.74	10
	Control	14.01	7.36	10
	Total	15.82	6.69	20
Flexibility	Experimental	25.43	6.58	10
	Control	20.19	8.16	10
	Total	22.81	7.69	20

The study's findings, as shown in Table 4, showed that the experimental group's muscular endurance, static balance, and flexibility had significantly improved when compared to the control group. The p-value associated with the F-statistics

for muscular endurance was 0.001, which was less than 0.05, indicating that the sit-up test showed improved muscular endurance. The results of the SENS balance test demonstrated improved static balance with a p-value linked with the F-statistics for static balance of 0.021, which was less than 0.05, and the Sit and Reach test indicated increased flexibility, with the p-value linked with the F-statistics for flexibility being less than 0.05. The statistical significance of these increases was validated by the ANCOVA analysis, confirming the beneficial effects of the Vinyasa yoga training module on certain physical fitness metrics.

Table 4: ANCOVA Table Dependent Variables: Muscular Endurance, Balance, and Flexibility After training

Variables	Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Muscular Endurance	Pre-test	1111.87	1	1111.87	1093.76	0.000
	Group	73.79	1	73.79	72.59	0.001*
	Error	17.28	17	1.017		
	Corrected Total	1202.95	19			
Static Balance	Pre-test	631.52	1	631.52	67.54	0.001
	Group	60.03	1	60.03	6.42	0.021*
	Error	158.94	17	9.35		
	Corrected Total	850.50	19			
Flexibility	Pre-test	1048.98	1	1048.98	460.78	0.000
	Group	38.81	1	38.81	17.04	0.001*
	Error	38.70	17	2.27		
	Corrected Total	1126.49	19			

Discussion: The findings of this study align with previous research highlighting the benefits of Vinyasa yoga. The study aims to analyse the influence of "six weeks vinyasa training module on the muscular endurance, static balance, and flexibility of yoga practitioners". The VYTM consisted of a well-structured battery of five series of vinyasa yoga postures that were practiced for six weeks, five days a week, for 30 minutes each. The study found that the experimental group improved considerably in muscular endurance, static balance, and flexibility, indicating that the VYTM was beneficial. According to the present study's findings, VYTM can significantly improve Muscular Endurance, Static Balance, and Flexibility. This study also shows that the five-day-a-week vinyasa yoga practice may have provided enough stimuli to improve Muscular Endurance, Static Balance, and Flexibility of yoga Practitioners. It is worth mentioning that even a 6-week intervention was adequate to improve Muscular Endurance, Static Balance, and Flexibility.

Furthermore, previous research has demonstrated that a yoga intervention improves adolescent balance, flexibility, and strength (Fillmore et al., 2010 and Singh, et al., 2023). A study found that yoga training might help obese people with poor standing balance (Jorrakate et al., 2015). The findings suggest that a regular yoga practice can enhance male college athletes' balance and flexibility, as well as whole body measures, hence improving athletic performance (Polsgrove et al., 2016).

Previous studies have also shown that long-term vinyasa yoga-based courses can considerably improve health-related fitness. Using cumulative goal heart rate objectives led to higher-than-expected increases in cardio-respiratory fitness and body composition (Boraczyński et al., 2020). Vinyasa is an alternate training strategy that can improve overall health and wellness (Tsopanidou et al., 2020). A study found that six months of Vinyasa instruction led to changes in maximal muscle torque and muscle topography (Buśko & Rychlik, 2006).

Regular exercise programmes, including resistance and yoga training, can improve lower limb strength and balance in people with multiple sclerosis (Hosseini et al., 2018). Another study found that yoga workouts help with balance and perception (Rayat, 2015).The 6-week yoga programme was proven to increase male football players' balance, flexibility, and strength; thus, coaches should incorporate it into training before the competition season since it will assist football players improve their overall motor abilities (Kartal & Ergin, 2020).

Evidently, these outcomes clearly support the current study of short-term yogic intervention for sports performance enhancement. One of the study's potential weaknesses that may have influenced the results was its small sample size. This study was centred on one gender (male), one sport (yoga), and one level of play (university), which may have hampered its generalise ability. Another research weakness was that the individuals' lifestyle, routine, eating habits, and socioeconomic status might have impacted the results.

Over time, it becomes clear that this study operates admirably as a pilot study, signalling the prospect of a broader inquiry. According to the findings, more study is needed to determine how effectively vinyasa yoga satisfies the

demands of additional population subgroups (e.g., disordered eating, overweight/obesity, sedentary, smokers, anxiety, stress, depression).

Future studies could look at other time periods, and researchers might employ analogous studies to address broad groups of players from various sports and genders. Other areas of future study should focus on the influence of vinyasa on physiological characteristics such as oxygen consumption variations, metabolic analysis, and energy expenditure at various vinyasa speeds and time periods. It is also possible to work up posture exercises, meditation techniques, and other forms of yoga, such as hatha and ashtanga, to see whether they improve other physical aspects of skill and fitness, such as static equilibrium, which is just as important in sports. It's possible that Vinyasa sequences' fluid, continuous motions enhance muscle activation and flexibility. It's possible that the focus on breathing control and movement synchronisation can improve core stability and balance. According to the study's findings, vinyasa yoga may be good for increasing balance, lowering the risk of injury in competitive sports, and ultimately helping to improve performance. Coaches and instructors should incorporate vinyasa into training programmes since it helps athletes build static body equilibrium.

Conclusion: This study concludes that Vinyasa yoga training module significantly improves flexibility, muscular endurance, and static balance among yoga practitioners. These findings support the inclusion of Vinyasa yoga in physical fitness programs and suggest further research to explore its long-term benefits and effects on other fitness parameters. Yoga instructors and practitioners are encouraged to consider Vinyasa yoga as a valuable addition to their practice for achieving better physical fitness and overall well-being.

References

1. Cote, K. P., Brunet, M. E., Gansneder, B. M., & Shultz, S. J. (2005). Effects of Pronated and Supinated Foot Postures on Static and Dynamic Postural Stability. Journal of athletic training, 40(1), 41–46.
2. Boraczyński, T.W., Wójcik, Z., Gajewski, J., & Laskin, J. J. (2020). The effects of a 6-month moderate- intensity hatha yoga-based training program on health-related fitness in middle-aged sedentary women: a randomized controlled study. The Journal of Sports Medicine and Physical Fitness, 60(8), 1148-1158. http://doi.org/10.23736/S0022-4707.20.10549-8
3. Buśko, K., & Rychlik, R. (2006). Changes of the maximal muscle torque in women training Power Yoga (Astanga Vinyasa). Human Movement, 7(2), 168–177. http://repozytorium.ukw.edu.pl/handle/item/1617
4. Coulson, M., & Archer, D. (2009). Practical fitness testing: Analysis in exercise and sport. London: A and C Black.
5. Cowen V. S. (2010). Functional fitness improvements after a worksite-based yoga initiative. Journal of bodywork and movement therapies, 14(1), 50–54. https://doi.org/10.1016/j.jbmt.2009.02.006
6. Cowen, V. S., & Adams, T. B. (2005). Physical and perceptual benefits of yoga asana practice: results of a pilot study. Journal of Bodywork and Movement Therapies, 9(3), 211–219. https://doi.org/10.1016/j.jbmt.2004.08.001
7. Cramer, H., Klose, P., Brinkhaus, B., Michalsen, A., & Dobos, G. (2017). Effects of yoga on chronic neck pain: a systematic review and meta-analysis. Clinical rehabilitation, 31(11), 1457–1465. https://doi.org/10.1177/0269215517698735
8. Feuerstein, G. (2003). The Deeper Dimension of Yoga: Theory and Practice. Shambhala Publications.
9. Field T. (2011). Yoga clinical research review. Complementary therapies in clinical practice, 17(1), 1–8. https://doi.org/10.1016/j.ctcp.2010.09.007
10. Fillmore, B. D., Brahler, C., Fisher, M. I., & Beasley, K. (2010). The effect of yoga postures on balance, flexibility, and strength in healthy high school females. Journal of Women's Health Physical Therapy, 34(1), 10-17. http://doi.org/10.1097/JWH.0b013e3181d4fe51
11. Grabara, M., & Szopa, J. (2015). Effects of hatha yoga exercises on spine flexibility in women over 50 years old. Journal of physical therapy science, 27(2), 361–365. https://doi.org/10.1589/jpts.27.361
12. Hagins, M., Moore, W., & Rundle, A. (2007). Does practicing hatha yoga satisfy recommendations for intensity of physical activity which improves and maintains health and cardiovascular fitness?. BMC complementary and alternative medicine, 7, 40. https://doi.org/10.1186/1472-6882-7-40
13. Hosseini, S. S., Rajabi, H., Sahraian, M. A., Moradi, M., Mehri, K., & Abolhasani, M. (2018). Effects of 8-Week Home-Based Yoga and Resistance Training on Muscle Strength, Functional Capacity and Balance in Patients with Multiple Sclerosis: A Randomized Controlled Study. Asian Journal of Sports Medicine, 9(3). https://doi.org/10.5812/asjsm.68807
14. Jeter, P. E., Slutsky, J., Singh, N., & Khalsa, S. B. (2015). Yoga as a Therapeutic Intervention: A Bibliometric Analysis of Published Research Studies from 1967 to 2013. Journal of alternative and complementary medicine (New York, N.Y.), 21(10), 586–592. https://doi.org/10.1089/acm.2015.0057
15. Jorrakate, C., Kongsuk, J., Pongduang, C., Sadsee, B., & Chanthorn, P. (2015). Effect of yoga training on one leg standing and functional reach tests in obese individuals with poor postural control. Journal of physical therapy science, 27(1), 59–62. https://doi.org/10.1589/jpts.27.59

16. Kansal, D. K., (2021). A textbook of sports science: test, evaluation, accreditation, measurements and standards (teams). K.K. Publications
17. Kartal, A., & Ergin, E. (2020). Investigation of the Effect of 6-week Yoga Exercises on Balance, Flexibility, and Strength in Soccer Players. International Journal of Human Movement and Sports Sciences, 8(3), 91–96. https://doi.org/10.13189/saj.2020.080303
18. Manjunath, N. K., & Telles, S. (2001). Improved performance in the Tower of London test following yoga. Indian journal of physiology and pharmacology, 45(3), 351–354.
19. Park, C. L., Groessl, E., Maiya, M., Sarkin, A., Eisen, S. V., Riley, K., & Elwy, A. R. (2014). Comparison groups in yoga research: a systematic review and critical evaluation of the literature. Complementary therapies in medicine, 22(5), 920–929. https://doi.org/10.1016/j.ctim.2014.08.008
20. Payne, L. L., & Usatine, R. (2002). Yoga Rx: A Step-by-Step Program to Promote Health, Wellness, and Healing for Common Ailments. Broadway Books.
21. Polsgrove, M. J., Eggleston, B. M., & Lockyer, R. J. (2016). Impact of 10-weeks of yoga practice on flexibility and balance of college athletes. International journal of yoga, 9(1), 27–34. https://doi.org/10.4103/0973-6131.171710
22. Ramaswami, S. (2005). The complete book of vinyasa yoga. da capo press. https://www.pdfdrive.com/the-complete book-of-vinyasa-yoga-complete-d33437381.html
23. Rayat, S. (2015). effect of practice of yoga exercises on balance and perception of national level players. Journal of Sports and Physical Education, 2(4), 25-30. http://doi.org/10.9790/6737-0242530
24. Saal, K. (2019, February 19). What is Vinyasa Yoga? One Flow Yoga. https://oneflowyoga.com/blog/what-is-vinyasa-yoga
25. Sharma, M., & Saha, M. (2023). Test-Retest reliability of sensa move, sensbalance miniboard. Mendeley Data. https://doi.org/10.17632/m2wmk8v7yn.1
26. Singh, K. R., Devi, M., Meto, H., Singh, M. S., & Singh, N. S. (2023). Yogic Intervention and its effect on Health-Related Physical Fitness. Journal for ReAttach Therapy and Developmental Diversities, 6(1), 2085-2090. https://doi.org/10.53555/jrtdd.v6i1.3205
27. Singleton, M. (2010). Yoga Body: The Origins of Modern Posture Practice. Oxford University Press.
28. Singleton, M. (2010). Yoga Body: The Origins of Modern Posture Practice. Oxford University Press.
29. Tsopanidou, A. A., Venetsanou, F. D., Stavridis, I. S., Paradisis, G. P. & Zacharogiannis, E. G. (2020). Energy expenditure during a Vinyasa yoga session. The Journal of Sports Medicine and Physical Fitness, 60(8), 1110-1117. http://doi.org/10.23736/S0022-4707.20.10821-1
30. Woodyard C. (2011). Exploring the therapeutic effects of yoga and its ability to increase quality of life. International journal of yoga, 4(2), 49–54. https://doi.org/10.4103/0973-6131.85485