**Journal of East-West Thought**
**ISSN: *2168-2259 (online)***
***(https://jetjournal.us/)***
**Volume 14, Issue 2 – June 2024 Impact Factor: 7.665**

UGC CARE I

# IMPACT OF YOGIC EXERCISES ON FLEXIBILITY AND RESPIRATORY EFFICIENCY IN YOUNG HANDBALL ATHLETES

**Mr. Kiran Anchan,** Ph.D. Scholar, Department of Physical Education, Sports Complex, University of Mumbai, Santacruz (East) Mumbai (MS)

**Dr. Manohar M. Mane,** Associate Professor, Department of Physical Education, Sports Complex, University of Mumbai, Santacruz (East) Mumbai (MS)

## ABSTRACT

The present study investigates the effect of yogic exercises on flexibility and respiratory efficiency among young handball athletes aged 14 to 18 years. Handball is a dynamic sport that demands high levels of flexibility, endurance, and respiratory control for optimum performance. Yogic practices, including asanas, pranayama, and relaxation techniques, have been shown to improve musculoskeletal flexibility and enhance lung function through regulated breathing patterns. For this study, 40 state-level handball players were selected randomly and divided into experimental and control groups of equal size. The experimental group underwent an 8-week yogic exercise program consisting of selected asanas (Bhujangasana, Paschimottanasana, Trikonasana, and Chakrasana) and pranayama practices (Anulom-Vilom, Kapalabhati, Bhramari) performed five days a week for 45 minutes per session. The control group continued with their routine handball practice without additional yoga intervention. Pre-test and post-test assessments were conducted using the Sit and Reach Test for flexibility and spirometric evaluation (Forced Vital Capacity, Forced Expiratory Volume, and Peak Expiratory Flow Rate) for respiratory efficiency. Results revealed a statistically significant improvement ($p < 0.05$) in both flexibility and respiratory efficiency in the experimental group compared to the control group. The study concludes that yogic exercises can be an effective supplementary training component for young handball players, contributing to enhanced performance, injury prevention, and overall physiological well-being.

**Keywords:** Yogic exercises, flexibility, respiratory efficiency, handball players, pranayama, asanas.

## INTRODUCTION

Handball is a fast-paced sport requiring a combination of speed, agility, muscular endurance, and effective respiratory functioning. In adolescent athletes, flexibility and respiratory efficiency play a crucial role in skill execution, recovery, and injury prevention. Despite the emphasis on strength and agility training in handball, the integration of yogic practices into athletic training programs remains relatively underexplored.

Yoga, an ancient Indian practice, combines physical postures (asanas), breathing techniques (pranayama), and meditation, offering holistic benefits to the body and mind. Flexibility is enhanced through static and dynamic stretches incorporated in asanas, which lengthen muscles and improve joint mobility. Similarly, pranayama regulates breathing and strengthens the

Journal of East-West Thought
ISSN: 2168-2259 (online)
(https://jetjournal.us/)
Volume 14, Issue 2 – June 2024
UGC CARE I

respiratory muscles, thereby enhancing vital capacity, oxygen uptake, and efficiency of gas exchange.

Research studies have indicated that yoga can contribute positively to sports performance by improving concentration, flexibility, and lung function. For adolescent athletes, especially in handball, the ability to sustain high levels of activity depends greatly on the efficiency of the respiratory system and muscular flexibility. Limited flexibility can increase the risk of musculoskeletal injuries, while poor respiratory function can reduce endurance and performance.

This study aims to examine the impact of a structured yogic exercise program on flexibility and respiratory efficiency in young handball athletes. By integrating yoga with sports training, it is hypothesized that athletes will achieve measurable improvements in physical and physiological parameters, ultimately enhancing performance and reducing injury risk.

## OBJECTIVES

1. To evaluate the effect of yogic exercises on the flexibility of young handball athletes.
2. To assess the impact of yogic practices on respiratory efficiency (FVC, FEV1, PEFR) of young handball players.
3. To recommend yoga as a supplementary training method for improving sports performance.

## REVIEW OF LITERATURE

Singh and Madanmohan (2004) conducted a study to evaluate the impact of yoga practices on the physical fitness of school children. Their findings revealed significant improvements in flexibility, balance, and coordination among participants who followed a structured yoga training program. The practice of asanas such as forward bends and spinal extensions enhanced joint mobility and reduced muscular stiffness. This research highlights the potential of yoga to improve flexibility, which is crucial for handball players in executing movements like passing and dodging. However, the study did not explore respiratory efficiency, leaving scope for further sport-specific investigations.

Gaur, Saini, and Majumdar (2014) carried out a study to examine the effect of yogic practices on respiratory parameters in young athletes. Their intervention included both asanas and pranayama techniques practiced over several weeks. The results showed significant improvements in lung function, particularly in Forced Vital Capacity (FVC), Forced Expiratory Volume (FEV1), and Peak Expiratory Flow Rate (PEFR). These findings suggest that yoga enhances ventilatory capacity and strengthens respiratory muscles, which are essential for endurance-based sports like handball. The study provides strong evidence for incorporating yogic breathing practices into athletic training, though flexibility measures were not emphasized.

Joshi, Joshi, and Gokhale (1992) studied the short-term impact of pranayama on breathing rate and ventilatory functions. Their research showed that regular practice of controlled breathing reduced respiration rate and improved lung function. Later, Pramanik, Pudasaini, and Prajapati (2010) explored the immediate effects of Bhramari pranayama on cardiovascular parameters

Journal of East-West Thought
ISSN: 2168-2259 (online)
(https://jetjournal.us/)
Volume 14, Issue 2 – June 2024
UGC CARE I

and found reductions in blood pressure and heart rate, indicating better autonomic control. Together, these studies emphasize that even short-term yogic breathing practices can yield measurable physiological benefits. For young handball athletes, such improvements in respiratory control and efficiency can directly enhance performance during high-intensity play.

Bhavanani, Madanmohan, and Sanjay (2012) examined the effect of sukha pranayama on cardiovascular functions and reported significant benefits in regulating heart rate and blood pressure. Similarly, Nagarathna and Nagendra (2010) presented a comprehensive account of yoga's role in promoting positive health, highlighting improvements in musculoskeletal flexibility, respiratory function, and psychological balance. These studies suggest that yoga provides holistic benefits beyond physical training, making it a valuable complementary practice for athletes. For young handball players, integrating yoga into daily training may enhance flexibility, lung capacity, and recovery, while also improving focus and reducing mental stress.

## METHODOLOGY

- **Sample:** 40 male state-level handball players, aged 14–18 years.
- **Design:** Pre-test, post-test randomized control group design.
- **Groups:** Experimental group (n=20) and control group (n=20).
- **Duration:** 8 weeks (5 sessions/week, 45 minutes per session).
- **Intervention (Experimental Group):**
  - **Asanas:** Bhujangasana, Paschimottanasana, Trikonasana, Chakrasana, Pawanmuktasana.
  - **Pranayama:** Anulom-Vilom, Kapalabhati, Bhramari.
  - **Relaxation:** Shavasana at the end of each session.
- **Control Group:** Continued regular handball practice without yoga.
- **Tests:**
  - Flexibility → Sit and Reach Test.
  - Respiratory Efficiency → Spirometry (FVC, FEV1, PEFR).
- **Statistical Tools:** Mean, Standard Deviation, Paired t-test, ANCOVA.

## RESULTS

**Table 1: Pre-test and Post-test Mean Scores of Flexibilities (Sit and Reach Test in cm)**

| Group | N | Pre-test Mean ± SD | Post-test Mean ± SD | Mean Difference | t-value | p-value |
|---|---|---|---|---|---|---|
| Experimental Group | 20 | 21.40 ± 3.25 | 25.60 ± 3.10 | +4.20 | 5.12 | 0.001* |
| Control Group | 20 | 21.10 ± 3.18 | 22.00 ± 3.11 | +0.90 | 1.02 | 0.31 |

**Interpretation:**

The experimental group showed a significant improvement ($p < 0.05$) in flexibility after yogic exercises, while the control group's change was not significant. This indicates that yoga effectively improves muscular flexibility.

Journal of East-West Thought
ISSN: *2168-2259 (online)*
*(https://jetjournal.us/)*
Volume 14, Issue 2 – June 2024
UGC CARE I

**Table 2: Pre-test and Post-test Mean Scores of Forced Vital Capacity (FVC in Liters)**

| Group | N | Pre-test Mean ± SD | Post-test Mean ± SD | Mean Difference | t-value | p-value |
|---|---|---|---|---|---|---|
| Experimental Group | 20 | 2.71 ± 0.28 | 3.09 ± 0.30 | +0.38 | 4.66 | 0.001* |
| Control Group | 20 | 2.69 ± 0.25 | 2.74 ± 0.24 | +0.05 | 0.87 | 0.39 |

**Interpretation:**
The experimental group recorded a significant increase in **FVC** after the yoga program, showing improved lung capacity. The control group had minimal, non-significant changes. This suggests yoga enhances respiratory efficiency.

**Table 3: Pre-test and Post-test Mean Scores of Forced Expiratory Volume (FEV1 in Liters)**

| Group | N | Pre-test Mean ± SD | Post-test Mean ± SD | Mean Difference | t-value | p-value |
|---|---|---|---|---|---|---|
| Experimental Group | 20 | 2.32 ± 0.21 | 2.73 ± 0.26 | +0.41 | 5.08 | 0.001* |
| Control Group | 20 | 2.30 ± 0.23 | 2.36 ± 0.22 | +0.06 | 0.91 | 0.36 |

**Interpretation:**
FEV1 values improved significantly in the experimental group, indicating enhanced efficiency of the respiratory muscles and stronger exhalation ability after yoga practice. No such improvement was observed in the control group.

**Table 4: Pre-test and Post-test Mean Scores of Peak Expiratory Flow Rate (PEFR in L/min)**

| Group | N | Pre-test Mean ± SD | Post-test Mean ± SD | Mean Difference | t-value | p-value |
|---|---|---|---|---|---|---|
| Experimental Group | 20 | 5.12 ± 0.44 | 5.64 ± 0.46 | +0.52 | 4.88 | 0.001* |
| Control Group | 20 | 5.10 ± 0.41 | 5.15 ± 0.42 | +0.05 | 0.72 | 0.48 |

**Interpretation:**
The experimental group showed a significant improvement in **PEFR**, indicating improved expiratory power and overall respiratory efficiency due to pranayama practices. The control group showed no meaningful change.

Journal of East-West Thought
ISSN: 2168-2259 (online)
(https://jetjournal.us/)
Volume 14, Issue 2 – June 2024
UGC CARE I

## DISCUSSION

The results of this study are consistent with previous research on yoga and sports training, which highlights the role of yoga in improving flexibility and lung function. Flexibility gains observed in the experimental group can be attributed to the regular practice of asanas that involve stretching of hamstrings, spinal extensors, and hip flexors. Improved flexibility reduces muscle stiffness, enhances range of motion, and lowers the risk of injuries in dynamic sports like handball.

The improvements in respiratory efficiency are likely due to pranayama practices, which strengthen the respiratory muscles and improve alveolar ventilation. Practices like Kapalabhati and Anulom-Vilom increase lung capacity and enhance oxygen delivery, which is critical during high-intensity intermittent play. Enhanced respiratory efficiency supports endurance, faster recovery, and better energy utilization.

Furthermore, yoga provides psychological benefits such as stress reduction, improved concentration, and better recovery. These secondary benefits, although not directly measured in this study, may contribute indirectly to improved athletic performance.

The findings suggest that incorporating yogic exercises into handball training can complement traditional strength and conditioning methods. Coaches and trainers should consider yoga as an essential component of sports training to enhance both physical and physiological capacities of young athletes.

## KEY FINDINGS

1. Studies show yoga postures significantly enhance musculoskeletal flexibility, which benefits agility and movement in handball.
2. Pranayama practices improve lung capacity, breathing control, and overall respiratory efficiency.
3. Yoga lowers heart rate and blood pressure, improving cardiovascular endurance and recovery.
4. Regular yoga practice helps athletes manage competitive stress and maintain psychological balance.
5. Meditation and breathing practices increase attention span, crucial for tactical play.
6. Specific yoga poses enhance functional strength and reduce fatigue.
7. Yoga supports faster post-training recovery by reducing muscle stiffness and promoting relaxation.
8. Yoga cultivates calmness, emotional control, and confidence in young players.
9. Integration of yoga with sports training leads to holistic improvements in athletic performance.
10. Even short-term yoga interventions show measurable improvements, while long-term practice sustains both physical and mental gains.

## CONCLUSION

This study demonstrates that an 8-week yogic exercise program significantly improves flexibility and respiratory efficiency among young handball athletes. The experimental group

Journal of East-West Thought
ISSN: *2168-2259 (online)*
*(https://jetjournal.us/)*
Volume 14, Issue 2 – June 2024
UGC CARE I

showed notable enhancements in Sit and Reach Test scores and spirometric measures (FVC, FEV1, PEFR), confirming the effectiveness of yoga as a supplementary training method. Improved flexibility ensures better movement mechanics and injury prevention, while enhanced respiratory efficiency contributes to higher endurance and recovery during matches.

Therefore, yoga should be recommended as a complementary training intervention for adolescent handball players. Integrating yoga with conventional handball practice can provide holistic benefits by improving physical, physiological, and psychological dimensions of sports performance. Future studies can extend this research by including female athletes, larger samples, and exploring psychological aspects such as concentration, stress, and motivation.

## FUTURE SCOPE

- Inclusion of both male and female athletes across different sports.
- Longitudinal studies to assess long-term impact of yoga on sports performance.
- Comparative studies between yoga, strength training, and other conditioning methods.
- Exploration of psychological outcomes such as anxiety reduction, mindfulness, and concentration.

## REFERENCES

1. Bhavanani, A. B., Madanmohan, & Sanjay, Z. (2012). Immediate effect of sukha pranayama on cardiovascular variables in patients of hypertension. *International Journal of Yoga, 5*(2), 104–107.
2. Chatterjee, P., & Mondal, S. (2014). Effect of regular yogic training on growth hormone and dehydroepiandrosterone sulfate as an endocrine marker of aging. *Evidence-Based Complementary and Alternative Medicine, 2014*, 1–8.
3. Gaur, G. S., Saini, M., & Majumdar, A. (2014). Effect of yogic practices on respiratory parameters in young athletes. *Journal of Physical Education and Sport*, *14*(2), 176–181.
4. Joshi, L. N., Joshi, V. D., & Gokhale, L. V. (1992). Effect of short term 'pranayam' practice on breathing rate and ventilatory functions of lung. *Indian Journal of Physiology and Pharmacology, 36*(2), 105–108.
5. Malshe, P. C. (2009). Yogic breathing and aerobic exercise for respiratory efficiency: A comparative study. *Yoga Mimamsa, 41*(1), 29–36.
6. Mooventhan, A., & Nivethitha, L. (2014). Scientific evidence-based effects of yoga in neurological disorders. *Annals of Indian Academy of Neurology, 17*(1), 74–80.
7. Nagarathna, R., & Nagendra, H. R. (2010). *Yoga for Promotion of Positive Health*. Swami Vivekananda Yoga Prakashana.
8. Pramanik, T., Pudasaini, B., & Prajapati, R. (2010). Immediate effect of a slow pace breathing exercise Bhramari pranayama on blood pressure and heart rate. *Nepal Medical College Journal, 12*(3), 154–157.
9. Singh, S., & Madanmohan, T. (2004). Influence of yoga practices on physical fitness of school children. *Indian Journal of Physiology and Pharmacology, 48*(2), 201–206.
10. Telles, S., & Desiraju, T. (1991). Heart rate and respiratory changes in pranayama practices. *Indian Journal of Medical Research, 94*(2), 189–196.