

THE INTEGRATIVE ROLE OF YOGA IN ADDRESSING OBESITY: A COMPREHENSIVE REVIEW

Dr. Kailash Chand Barulia^{*1}, Dr. Sunil Kumar², Dr. Radhika Mahajan³, Dr. Durgawati Devi⁴ and Dr. Punit Chaturvedi

^{1,2,3}MD Scholar, Department of Swasthavritta, National Institute of Ayurveda, Jaipur, Rajasthan.

⁴Professor Department of Swasthavritta, National Institute of Ayurveda, Jaipur, Rajasthan.

⁵Assistant Professor In Swasthavritta Evam Yoga Department, National institute of Ayurveda Jaipur.



*Corresponding Author: Dr. Kailash Chand Barulia

MD Scholar, Department of Swasthavritta, National Institute of Ayurveda, Jaipur, Rajasthan.

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ABSTRACT

Introduction: Obesity poses a pervasive global health challenge, prompting exploration beyond conventional interventions. This research delineates the rationale for investigating yoga's role in obesity management, emphasizing the need for holistic approaches. **Objective:** The objective is to systematically develop a comprehensive understanding of how yoga intricately influences obesity. **Methods:** Refer to authoritative texts on yoga, obesity, and integrative health to establish a strong foundational understanding, and concurrently, gather relevant scientific articles, reviews, and studies pertaining to the integrative role of yoga in obesity. Additionally, employ databases such as PubMed, ScienceDirect, and Google Scholar to access a comprehensive array of scholarly articles. **Results:** The review reveals a multifaceted role of yoga in obesity management. Physiologically, yoga exhibits efficacy in weight reduction and enhances metabolic parameters. Psychologically, it contributes to stress reduction and cultivates mindfulness. Behaviorally, yoga promotes healthier lifestyle choices, presenting a holistic paradigm for addressing obesity. **Conclusion:** Yoga emerges as a promising and holistic approach in the comprehensive management of obesity. This research consolidates key findings, providing a foundation for future research and reinforcing the potential of yoga as a valuable component in addressing the multifaceted challenges of obesity.

KEYWORDS: Obesity, Yoga, Integrative role, Systematic Review, Physiological impact, Psychological benefits.

INTRODUCTION

Excessive body weight and obesity denote the accumulation of excessive adipose tissue, presenting a substantial hazard to health and amplifying the susceptibility to morbidity stemming from diverse maladies, including hypertension, dyslipidemia, type 2 diabetes, coronary heart disease, stroke, non-alcoholic fatty liver disease, osteoarthritis, sleep apnea, and malignancies of the endometrium, breast, prostate, and colon.^[1] This predicament extends its reach beyond the confines of developed nations, manifesting as a noteworthy health challenge in developing countries such as India^[2], particularly in metropolitan areas. Acknowledged as global health crises by the esteemed World Health Organization (WHO)^[3], overweight and obesity afflicted upwards of 1.4 billion adults in 2008, with 200 million men and 300 million women meeting the criteria for obesity. These conditions hold the esteemed position of being the 5th leading risk factors for worldwide mortality. Sedentary lifestyle and consumption of calorically dense, nutritionally deficient

fare^[4], contribute substantially to the burgeoning prevalence of obesity. Recent empirical investigations accentuate disquieting frequencies of obesity in both adolescents and adults, with an estimated 30 to 65% of the urban Indian populace contending with conditions such as overweight, obesity, or abdominal adiposity. Regional disparities, as exemplified by a study in Dakshina Kannada, reveal a comparatively lower prevalence ranging from 4-7%.^[5]

Diagnosis of Overweight and obesity

Body Mass Index (BMI) functions as a pivotal indicator and diagnostic criterion for the identification of overweight and obesity. Its computation involves the division of weight in kilograms by the square of height in meters. The World Health Organization (WHO) delineates overweight at BMI 25 kg/m² and obesity at >30 kg/m².^[6] Recognizing the distinct body fat composition among Asians compared to Caucasians of identical age, sex, and BMI, the WHO revised BMI categories in 2004. In this study, a recalibrated BMI

classification was employed, characterizing overweight as BMI between 23.0-24.9 kg/m² and obesity as BMI 25 kg/m².^[7] Despite its ubiquity, BMI is constrained by inherent limitations, notably its inability to discern lean body mass from fat mass and its omission of information regarding fat distribution. Acknowledging the pivotal role of abdominal/visceral fat in obesity-related diseases, this study incorporates Waist Circumference (WC) as a pertinent metric. WC is measured between the lower rib margin and iliac crest, utilizing a horizontal tape, while Hip Circumference is measured at the widest point of the buttocks. A Waist Circumference exceeding 80 cm (in women) or 94 cm (in men) and a Waist-to-Hip Ratio (WHR) exceeding 0.90 for males and 0.85 for females are indicative of increased cardio-metabolic risks in European populations.^[8]

Management of Overweight and obesity

Viable therapeutic approaches for severe obesity include pharmacotherapy and bariatric surgery.^[9] However, these interventions come with substantial costs and potential side effects, rendering them financially inaccessible to a significant portion of the obese population. Consequently, the imperative lies in the management of obesity for the sake of overall health and an enhanced quality of life. Achieving this goal is possible through accessible, non-invasive, and non-pharmaceutical treatment options, such as the modification of dietary habits, participation in yoga training, and an increase in physical activity.^[10]

Yoga therapy regimen for obesity

Prayer

Invocation holds a crucial role in fostering mental serenity. The prevalence of the Alpha rhythm during the act of prayer engenders broad-reaching effects across the entire physiological system. This practice confers advantages spanning physical, mental, and spiritual domains, delivering anxiolytic and stress-alleviating effects to the body.^[11]

Sukshma Vyayama

Sukshma Vyayama is systematically incorporated into the prelude of any asana routine. This regimen involves the systematic stretching of diverse muscle groups, articulation of major and minor joints, and flexion of various body segments. Its application serves to alleviate muscle tension, diminish joint stiffness, enhance overall blood circulation, and instill a preparatory warmth throughout the body.

Surya Namaskar

Comprising twelve distinct postures, namely Pranamasana, Hasta Uttanasana, Pada Hastasana, Ashwa Sanchalana, Parvatasana, Ashtanga Namaskara, and Bhujangasana, this series of asanas serves to activate the chakras within the human body, facilitating the release of vital energy to elevate superior consciousness. Suryanamaskara, in particular, generates internal heat, deviating from the thermal axis of the body. This results

in an elevated basal metabolic rate, providing a comprehensive muscular massage that aids in fat reduction^[12] across various body regions. As an integrated practice involving the body, breath, mind, and devotion, it represents a holistic therapeutic approach for the prevention and treatment of obesity.

Asanas

These designated poses serve as static stretching techniques to establish equilibrium in both the mind and body. Asanas contribute to a state of relaxation, fortitude, and buoyancy, alleviating discomfort and fostering emotional as well as mental tranquility.

Tadasana

Referred to as the Palm Tree Posture, Tadasana involves maintaining an upright and straight stance. Individuals experiencing back pain and visceroptoses, common in those with obesity, find relief through the practice of this asana.

Ardha Chakrasana

This pose imitates a half-wheel shape, where the term "Chakra" signifies 'wheel.' By exerting pressure on the abdomen, Ardha Chakrasana effectively diminishes belly fat and alleviates spinal stiffness.

Trikonasana

Trikonasana imparts a triangular form to the body, enhancing spinal flexibility and mitigating hip joint stiffness. It also extends and stretches the thighs and hamstring muscles.^[13]

Vajrasana

Renowned as the sole asana permissible immediately after a meal, Vajrasana aids digestion and enhances blood flow to the lower pelvic region. This posture fortifies the thigh and calf muscles.

Uttanapadasana

Constituting a supine series of asanas, Uttanapadasana serves as a foundational stage for poses like Halasana, Viparita Karani, and Sarvangasana. By applying pressure to the lower abdominal muscles, it regulates bowel habits, boosts digestion, reduces excess abdominal fat, and strengthens the rectus abdominis muscles, along with the muscles of the thighs and pelvic region.^[14]

Pavanamuktasana

Etymologically derived from Sanskrit, wherein 'Pavan' denotes 'wind' and 'mukta' signifies 'free' or 'release,' Pavanamuktasana is aptly named the Wind Releasing Posture. This particular asana serves the purpose of expelling flatulence from the intestines and stomach while concurrently administering a thorough massage to the abdominal muscles. Its execution involves deliberate tension in the muscles alongside the simultaneous compression of internal organs through the folding of legs. Principally valued for its efficacy in alleviating

constipation and flatulence, it additionally contributes to the toning of the muscles in the dorsal region^[15]

Naukasana

Assuming a configuration reminiscent of a boat, Naukasana applies deliberate pressure to the mid-abdominal region, yielding beneficial effects in conditions such as diabetes and dyspepsia.

Matsyasana

Emulating the silhouette of a fish submerged in water, Matsyasana provides a commendable massage to the abdominal organs and muscles. It imparts a beneficial stretch to the pelvic region, thyroid, and pituitary glands, enhancing their circulation and functional capabilities. This particular posture also facilitates the stretching of the thigh and abdominal muscles.

Bhujangasana

Rooted in the Sanskrit term 'Bhujanga,' translating to 'cobra,' the final stance of Bhujangasana replicates the hooded posture of a serpent. This particular pose serves to expand the chest, fortify chest muscles, enhance back flexibility, and administer a stimulating massage to abdominal and pelvic organs. It significantly contributes to improved digestive processes, respiratory functions, and the reduction of abdominal adiposity, aligning with Yogic principles that affect Manipura and Anahata chakras.

Ardhasalabhasana

A simplified iteration of Shalabhasana, Ardhasalabhasana is specifically tailored for individuals who may find the former challenging. It primarily targets the strengthening of thigh extension muscles and the toning of lower abdominal muscles, with notable effects on the Muladhara and Manipura chakras.

Dhanurasana

Assuming the form of a bow, Dhanurasana, as delineated in Hatha Yoga Pradipika and Gheranda Samhita, addresses concerns related to abdominal adiposity, constipation, and cultivates flexibility in the musculature of the back and spine. This pose concurrently contributes to the fortification of leg and arm muscles.

Viparita Karani

Viparita Karani, an asana that follows Uttanapadasana, plays a crucial role in influencing the normal functioning of the thyroid glands. This particular yoga posture provides a therapeutic approach for individuals dealing with obesity linked to hypothyroidism, a condition characterized by an underactive thyroid gland.

By assuming the inverted position in Viparita Karani, where the legs are elevated while the torso rests on the floor or a support, the gravitational pull facilitates blood circulation around the neck region. This, in turn, stimulates and regulates the thyroid glands. The thyroid, being a vital endocrine gland, plays a central role in

metabolism and energy regulation. The inversion in Viparita Karani is believed to have a balancing effect on the thyroid function, making it a beneficial practice for those with hypothyroidism-related obesity.

In addition to its impact on thyroid health, Viparita Karani proves advantageous for various other conditions. It has been found beneficial in cases of dyspepsia, a digestive disorder characterized by discomfort or pain in the upper abdomen. The inversion aids in improving blood circulation to the abdominal organs, potentially contributing to digestive well-being.

Furthermore, Viparita Karani is considered helpful in addressing hernia and viceroptosis. The controlled inversion may assist in the management of these conditions by promoting organ support and tonicity.

Paschimottasana

Paschimottasana, as documented in Hathayoga Pradipika, is a yoga posture specifically crafted to offer a range of physical benefits, focusing on the elongation and toning of the muscles in the abdominal region.

The primary objective of Paschimottasana is to lengthen the muscles of the abdomen systematically. As the practitioner reaches forward toward their toes, the stretching action engages the abdominal muscles, promoting flexibility and suppleness. This elongation not only contributes to a sculpted appearance but also aids in strengthening the core muscles, fostering stability in the torso. Simultaneously, Paschimottasana addresses hip joint stiffness, a common concern for many individuals. The forward-bending nature of the pose involves a deliberate extension of the hip joint, enhancing its range of motion and reducing stiffness. This can be particularly beneficial for those experiencing discomfort or limited mobility in the hip area. Furthermore, Paschimottasana is designed to alleviate tension in the thigh and calf muscles. The act of bending forward from a seated position stretches these muscle groups, promoting flexibility and relieving tightness. This release of tension can be especially beneficial for individuals who spend extended periods sitting, as it helps counteract the effects of prolonged sedentary behavior. Overall, Paschimottasana offers a comprehensive approach to physical well-being, combining abdominal elongation, hip joint flexibility, and tension relief in the lower limbs.

Pranayama - Anulomaviloma

Anulomaviloma is a pranayama practice involving the deliberate alternation of inhalation and exhalation through the left and right nostrils. This technique is rooted in the understanding of the subtle energy channels known as Nadis in yogic philosophy.

The left nostril, referred to as Ida Nadi or Chandra Nadi, is associated with a cooling effect on the body. It symbolizes the energy conservation aspects of Pranic functions, aligning with the receptive and nurturing

qualities associated with the lunar energy. In contrast, the right nostril, identified as Pingala Nadi or Surya Nadi, imparts a catabolic, heating, and transformative influence, resonating with the qualities of solar energy.

Anuloma Viloma Pranayama is specifically designed to purify the Nadis, the subtle channels through which prana (vital life force) flows. By systematically engaging both nostrils, this practice eliminates obstructions and ensures a balanced and harmonious flow of prana within the energy channels. The intentional regulation of breath through these channels serves to synchronize and balance the flow of vital energy within the body.

Additionally, Anuloma Viloma Pranayama has therapeutic implications for individuals dealing with obesity. The practice mitigates Kapha dosa. An imbalance in Kapha dosa is often linked to conditions of excess accumulation, such as obesity. By incorporating Anuloma Viloma into a regular routine, practitioners can address the underlying imbalances, purify the energy channels, and contribute to the overall well-being, making it a valuable tool in the holistic approach to managing obesity through yogic practices.

Pranayama - Bhastrika

The practice of Bhastrika, a dynamic breathing exercise in yoga, holds therapeutic significance by virtue of its capacity to normalize the vitiated Kapha dosha, making it particularly advantageous in addressing obesity-related concerns.

According to Ayurveda, the Kapha dosha imbalance can lead to conditions characterized by heaviness, lethargy, and excess accumulation. Obesity, often linked with an aggravated Kapha dosha, manifests as an accumulation of excess adipose tissue and a sluggish metabolism.

Bhastrika, with its forceful and rhythmic inhalation and exhalation, generates internal heat in the body. This heightened internal warmth, along with the vigorous breath control, contributes to balancing the Kapha dosha. By normalizing the vitiated Kapha dosha, Bhastrika helps mitigate the excess accumulation of weight and facilitates a more efficient metabolism.

Moreover, the increased oxygenation and vital energy stimulated by Bhastrika enhance overall metabolic activity, promoting the breakdown of accumulated fat. This, in turn, aids in weight management and provides a supportive measure in combating obesity.

In the broader context of Ayurvedic principles, Bhastrika's efficacy in normalizing Kapha dosha aligns with the holistic approach of addressing the root cause of imbalances rather than merely treating the symptoms. Regular practice of Bhastrika, under proper guidance, can be a valuable component in an integrated approach to managing obesity by harmonizing the body's elemental energies.

Chanting of Aum Mantra^[16]

The recitation of the Aum mantra bears profound significance as each constituent sound—'A,' 'U,' and 'M'—is intricately connected to specific chakras, aligning with the subtle energy centers in the body. 'A' resonates with the Muladhara and Swadhisthana chakras, grounding and nurturing the energies associated with the foundational aspects of existence. 'U' corresponds to the Manipura chakra, influencing the transformative and fiery qualities linked with personal power and identity. 'M' is affiliated with the Anahata, Visuddhi, and Anja chakras, imparting resonance to the heart, throat, and third eye centers, thereby touching upon realms of love, communication, and intuition.

The act of reciting the Aum mantra, especially when repeated ten times, engenders a profound internal focus. This rhythmic repetition accentuates the prominence of the Alpha rhythm, a neural oscillation indicative of a relaxed and alert state. Simultaneously, the repetition fosters a synchronization of blood pressure and heart rate. This synchronization induces a state of parasympathetic predominance, activating the body's rest and digest response, which, in turn, cultivates an environment conducive to calmness and inner peace.

The regular practice of Aum chanting exhibits tangible benefits, particularly in individuals grappling with obesity. It contributes to the enhancement of sleep patterns, fostering a more restful and rejuvenating sleep. Additionally, Aum chanting serves as a potent tool in alleviating anxiety and hypertension—common conditions observed in individuals dealing with obesity. The multifaceted impact of Aum chanting extends beyond the vocal act, delving into the realms of physiological and psychological well-being, aligning with the holistic principles inherent in yogic practices.

Shat Karma - Kapalbhati

In the practice of Kapalbhati, the respiratory process takes on a shallow pattern characterized by a reduction in tidal volume—the amount of air breathed in with each breath—and a simultaneous increase in breathing rate. This altered breathing pattern leads to a heightened oxygen consumption. The forceful contraction and subsequent relaxation of abdominal muscles, integral components of the Kapalbhati technique, actively contribute to the reduction of abdominal fat.

The efficacy of Kapalbhati in diminishing Kapha dosha, as asserted by both Gheranda Samhita and Hathayoga Pradipika, underscores its significance as a yogic practice with potential benefits in balancing and mitigating imbalances related to the Kapha dosha—an essential concept in Ayurveda, representing elements of Jala(water) and pruthavi (earth), associated with qualities like heaviness and excess accumulation. The specific techniques employed in Kapalbhati align with traditional yogic wisdom, advocating its potential impact on the body's energetic and constitutional aspects.

DISCUSSION

Yoga originated in ancient India, evolving to promote a vibrant lifestyle and meditation practices.^[17] This discipline incorporates physical postures (asanas), consciously regulated breathing techniques (pranayamas), meditation, and specific philosophical principles.^[18] Consistent engagement in asanas fosters physical strength, flexibility, and endurance.^[19] and can serve as a moderate-intensity exercise suitable for individuals with limited aerobic capacity or constrained ability to engage in physical activity.^[20] Moreover, yoga has proven efficacy in reducing hypertension and cardiac inflammation, stabilizing the sympathetic nervous system, and enhancing both psychological well-being and cardiac function.^{[21],[22],[23]} Research involving individuals diagnosed with type 2 diabetes mellitus demonstrated a notable reduction in BMI, blood glucose levels, and positive alterations in oxidative stress status after a three-month yoga intervention.^[25] A decline in percentage of body fat, total cholesterol, TAG, and LDL, along with reductions in systolic blood pressure, diastolic blood pressure, and heart rate, were noted in individuals with coronary artery disease (CAD) after engaging in yoga practice.^[24] Yoga practice led to positive alterations in metabolic syndrome risk factors among healthy postmenopausal women.^[26] After participating in yoga, subjects with a body fat percentage exceeding 36% demonstrated ameliorated serum lipid profiles and advantageous alterations in risk factors associated with metabolic syndrome. Furthermore, a condensed and intensive yoga regimen induced a decline in serum leptin levels, concomitant with favorable adjustments in BMI, waist-to-hip ratio, and total cholesterol.^[27] Engaging in Surya Namaskaras elevates energy expenditure, leading to statistically notable alterations in both body composition and weight.^[28] A decrease in body weight is noted to diminish markers of oxidation, while also enhancing metabolic and cardiovascular indicators associated with obesity.^[29] The studies mentioned above demonstrate that yoga provides support for mitigating overweight or obesity and addressing associated comorbid conditions. This is achieved by delivering recommended levels of exercise and reducing oxidative stress. Moreover, it presents itself as an attractive alternative exercise training program, requiring minimal equipment.^[30]

CONCLUSION

Yoga can contribute to address obesity by promoting mindfulness, fostering a balanced lifestyle, and encouraging physical activity. Its emphasis on stress reduction may help prevent emotional eating, while the physical practice enhances flexibility and strength. However, it should be part of a comprehensive approach, including a healthy diet and regular aerobic exercise, for effective weight management.

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