



Research Article

EFFECT OF YAVA SYAMAKA PEYA AND SURYANAMASKARA IN OVERWEIGHT ADULTS

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ABSTRACT

Overweight refers to abnormal or excessive fat accumulation that presents a risk to health. Overweight is currently widespread in both developed and developing countries, affecting both children and adults. A higher prevalence is observed among individuals of high socioeconomic status, particularly in urban areas. Modern lifestyles and poor dietary habits are the primary factors contributing to the development of overweight. If not managed promptly, overweight can progress to obesity, leading to a host of pathological complications. The management of overweight should focus on promoting appropriate dietary choices and boosting energy expenditure through physical activity. *Yava Syamaka Peya* mentioned in *Bhavaprakasha Nighantu* was adopted as a dietary intervention. Along with this diet, *Suryanamaskara* was made into the daily routine of participants for a period of 3 months. The intervention, consisting of 300ml of *Yava Syamaka peya* along with the daily practice of 12 rounds of *Suryanamaskara*, was conducted in 31 subjects. The results were analysed using the paired t-test and repeated measures ANOVA test. The study found a considerable reduction in body weight, with an average loss of 6.65kg over 3 months. Participants experienced an average decrease of 2.645kg/m² in BMI and a reduction of 0.035 in the waist-hip ratio. Additionally, FBS decreased by 14.71mg/dl, and total cholesterol levels dropped by an average of 23.42mg/dl. These results were statistically significant. From this, it is concluded that the intake of *Yava Syamaka peya* along with the practice of *Suryanamaskara* for 3 months is effective in reducing overweight.

INTRODUCTION

Non-communicable diseases (NCD's) have become a major global health concern in recent decades, putting a heavy burden on people's lives, communities, and healthcare systems across the globe. NCDs killed at least 43 million people in 2021, equivalent to 75% of non-pandemic-related deaths globally, the foremost cause being cardiovascular disease. Of all NCD deaths, 73% are in low- and middle-income countries [1]. The condition of overweight has surged to alarming levels, increasing the risk of developing NCDs including obesity, hypertension, cardio vascular diseases etc.

Overweight ranks as the fourth leading metabolic risk factor that cause death globally. Currently in India, NCDs have emerged as a major public health challenge due to rapid urbanization, changing dietary patterns, sedentary lifestyles, and increasing tobacco consumption. According to WHO, NCDs account 63% of all deaths in India, with cardiovascular diseases and diabetes being the primary contributors[1]. According to NFHS-5 (2019-2021) report, one out of every five people in India is either overweight or obese[2].

The term overweight refers to excess body weight for a particular height. Overweight over a long period of time have a tendency to develop into obesity which is a significant risk factor for CVD, PCOD, cancer etc. Causes of overweight are multifaceted, encompassing dietary patterns high in processed foods, sedentary lifestyles, inadequate physical activity, genetic predisposition, and environmental factors that promote unhealthy behaviours.

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In Kerala, despite being known for its high literacy rates and commendable healthcare infrastructure the prevalence of overweight and obesity has been steadily increasing attributing to its rapid epidemiological transition. Urbanization, changes in dietary patterns, sedentary lifestyles, and stress are key drivers fuelling the NCD epidemic in Kerala. A study published in the Indian Journal of Community Medicine revealed the prevalence of overweight among adults of Kerala as 39.4%. According to NFHS-5, Kerala's obesity rate surpasses the national average, with 38.1% of women and 36.4% of men in the age group of 15 to 49 years being obese^[2].

In Ayurveda, Overweight can be correlated with *Medoroga* or *Sthoulya*. *Athisthoola* is considered one among '*Astauninditha purusha*' (8 despicable persons) by *Charaka*^[3]. *Charaka Samhita Sutrasthana* in "*Ashtouninditeeya adhyaya*" has given a detailed explanation of the *samprapti* (prognosis) of *Sthoulya*. Excessive consumption of *Santharpana ahara* (nourishing food) is considered to vitiate *Kaphadi doshas* leading to derangement of *Dhatvagni*^[4]. *Dhatvagni mandhya* cause accumulation of *Medas* (fat) in unwanted areas of body. Here, *Langhana* should be the main line of management. According to *Charaka*, the medicaments and dietary preparations which are *Guru Atharpanam* (heavy and non-nourishing) is the line of treatment for *Atisthoulya*^[5]. *Guru* and *Atharpana dravyas* controls *Agni* and formation of vitiated *Medas*. Also, lack of physical activity contributes to *Sthoulya*. Effective management of overweight should involve multidisciplinary approach to assist patients in losing weight, maintaining a healthy body weight, and managing other risk factors. Overweight being a metabolic disorder resulting from over nourishment, the primary treatment goal should be to reduce food intake and increase physical activity. For this, *Yava Syamaka peya* can be added to daily diet schedule which is low in glycaemic index and leads to proper functioning of *Agni* which in turn improves the formation of *Dhatu*. *Kapha-medohara* properties of *Yava Syamaka peya*, make them effective for weight reduction and the prevention of associated complications. In addition to dietary modification, performing any kind of physical activity is crucial for maintaining a healthy weight because it helps burn calories, build muscle, and improves metabolism. Furthermore, regular exercise plays a vital role in regulating hormones such as insulin and leptin, which control appetite and fat storage. In this trial *Suryanamaskara* has been incorporated as a means of physical exercise. It is a form of *yoga* comprising of various postures that tend to stimulate and strain the body as a whole.

AIM

To evaluate the effect of *Yava Syamaka peya* and *Suryanamaskara* in overweight adults.

OBJECTIVE

Primary objective: To study the effect of *Yava Syamaka Peya* and *Suryanamaskara* on BMI and Waist-hip ratio (WHR) in Overweight adults

Secondary objective: To study the effect of *Yava Syamaka Peya* and *Suryanamaskara* on waist circumference, hip circumference, FBS and Total Cholesterol level in overweight adults

Study Design - Interventional Pre-Post Clinical Trial

Study Setting - OPD of Govt. Ayurveda College Hospital, Tripunithura.

Selection of Subjects

a) Subject inclusion criteria: Subjects within the age group 25-50 yrs having Body Mass Index between 25-29.99kg/m², with Waist-Hip ratio ≥ 0.90 (males) ≥ 0.85 (females) and with written informed consent were selected for the study. Subjects were selected irrespective of profession, religion, caste and economic status.

b) Subject exclusion criteria: Subjects with diagnosed case of PCOD, thyroid dysfunction and other chronic systemic illness, with musculoskeletal disorders like IVDP, pregnant ladies and lactating mothers, who have undergone any surgeries within last 6 months and who are unable to do yoga properly are excluded from the study.

Methodology

In this study 31 Subjects diagnosed as having overweight between the age group of 25 to 50 years were selected, from OPD of Govt. Ayurveda College Hospital, Tripunithura, as per the inclusion and exclusion criteria. The study subjects were advised to perform *Suryanamaskara* daily morning for 12 rounds and take 300ml of *Yava Syamaka peya* as dinner daily at 7:00pm for a period of 90 days. Before the start of trial, one week of training was given for learning *Suryanamaskara*. Assessment of body weight, BMI, Waist-hip ratio was done on 0th day, 31st day, 61st day and 91st day of intervention. Along with this, FBS and total cholesterol was assessed on 0th and 91st day of the study period. Yogic protocol included initial loosening exercises, followed by 12 rounds of *Suryanamaskara* and at last *Savasana*. The diet was prepared using 48 grams each of *Yava* and *Syamaka* as per the method for preparation of *Peya*^[6].

a) Name and details of drug

Table 1: Details of drugs used

Name	English Name	Malayalam Name	Botanical Name	Family	Part Used
Yava	Barley	Barley	<i>Hordeum vulgare</i>	Poaceae	Grains
Syamaka	Little millet	Chaama	<i>Panicum sumatrense</i>	Poaceae	Grains

b) Collection and distribution of Yava and Syamaka

24 grams each of high-quality Yava and Syamaka were purchased from an authorized raw material dealer. The 24 grams of Yava and 24 grams of Syamaka were combined into a single sachet. Fourteen packets of these sachets were then distributed to study subjects once every two weeks and a total of ninety packets for three months. A leaflet containing the method of preparation was also distributed along with the packets.

c) Method of preparation of Yava Syamaka peya

24 grams each of Yava and Syamaka are taken. Both items are washed thoroughly 3-4 times and then cooked in 672ml of water for 30 minutes to prepare Peya. It is then consumed lukewarm.

Ethical Clearance

Ethical clearance was obtained from the Institutional Ethics Committee (IEC), Govt. Ayurveda College, Tripunithura, dated 10/08/2022. Ethics Committee reference number 05/SV/IEC/2022

OBSERVATION AND RESULTS

Table 2: Difference in weight with time

Weight	Mean	Std. Deviation	Std. Error	F value	P value
0 th day (BT)	70.452	6.986	1.255	425.6*	<0.0001
31 st day (AT-1)	68.716	6.853	1.231		
61 st day (AT-2)	66.239	6.909	1.241		
91 st day (AT-3)	63.806	7.057	1.267		

There was a significant reduction in the body weight of the subjects, with an average weight loss of 6.65kg over the three month study period.

Table 3: Difference in BMI with time

Weight	Mean	Std. Deviation	Std. Error	F value	P value
0 th day (BT)	27.990	1.200	0.215	431.1*	<0.0001
31 st day (AT-1)	27.306	1.285	0.231		
61 st day (AT-2)	26.300	1.357	0.244		
91 st day (AT-3)	25.345	1.435	0.258		

An average reduction of 2.65 kg/m² in BMI was observed, which was statistically significant.

Table 4: Difference in Waist-Hip ratio with Time

WHR	Mean	Std. Deviation	Std. Error	F value	P value
0 th day (BT)	0.919	0.037	0.007	141.3*	<0.0001
31 st day (AT-1)	0.908	0.035	0.006		
61 st day (AT-2)	0.896	0.034	0.006		
91 st day (AT-3)	0.884	0.037	0.007		

The waist-hip ratio showed a significant reduction of 0.035 between the treatment stages.

Table 5: Analysis on Total Cholesterol

Total cholesterol	Mean	Standard deviation	Standard error	Paired Mean Difference	t value	P value
0 th day	194.355	21.391	3.842	23.419	12*	<0.0001
91 st day	170.935	14.676	2.636			

The total cholesterol level showed a significant reduction, with an average decrease of 23.42 mg/dL over the three-month intervention period.

Table 6: Analysis on FBS

FBS	Mean	Standard deviation	Standard error	Paired Mean Difference	t value	P value
0th day	95.806	20.731	3.723	14.71	5.254*	<0.0001
91st day	81.097	10.790	1.938			

FBS values showed a reduction, with an average decrease of 14.71 mg/dL over the three-month period.

DISCUSSION

Probable mode of action of Yava Syamaka Peya

Sthoulya, a condition resulting from excessive nourishment (*Santarpanajanya vikara*), should be treated with *Apatarpana kriya*. Consuming *Madhura*, *Sheeta*, *Guru ahara* (which are nourishing in nature) can contribute to *Sthoulya*. Therefore, the recommended dietary approach is to choose foods that are heavy but not overly nourishing. Both *Yava* and *Syamaka* are recommended as *Pathya* for *Santarpanotha vyadhis* because of its *Rukshana* and *Soshana* properties.

Yava (barley), with its *guru* property, is digested slowly, promoting a sense of fullness and satiety. This helps manage excessive appetite. Due to its *Kashaya* taste, *Ruksha* quality, *Katu vipaka* and *Lekhana* property, *Yava* effectively performs *Kledasoshana* and *Lekhana*^[7]. This aids in removing excess *Kapha* and *Medas*, thereby supporting fat loss. Additionally, *Yava* helps clear *Srotorodha* (blockages in the channels) by eliminating excess *Kapha* and *Medas*. It also increases the bulk of faeces and also acts as a diuretic, promoting the elimination of toxins from the bowel and bladder. From a modern perspective, barley, which is rich in soluble fibre (beta glucan), increases the bulk in gut, leading to greater satiety and slower digestion. This helps in controlling appetite and reducing fat absorption from the intestine, which in turn lowers blood cholesterol levels. The rich fibre in *Yava* also supports gut microbiome thus preventing occurrence of inflammation in body and also metabolic diseases. Barley's low glycaemic index (GI-30) means it releases sugar into the bloodstream gradually, helping to maintain normal blood glucose levels. Additionally, its richness in minerals and vitamins like B vitamins, iron, zinc, magnesium, potassium, phosphorus etc provides antioxidant properties that aid in the removal of toxins from the body. The magnesium in barley prevent rise in blood sugar by helping in insulin production. Phytochemicals in barley promote the growth of essential gut bacteria. Selenium in barley has antioxidant property and removes free radicals^[8].

Syamaka (little millet) with its *Kashaya rasa* along with its *Laghu*, *Ruksha guna*, *Katu vipaka* helps reduce the excess *Kapha* and *Medas* in the body^[9]. This results in *Srotosodana*, improves *Agni* and helps cure *Ama*. The high fibre and protein content in little millet aid in reducing excessive hunger and promoting satiety. The high fibre content and presence of essential fats regulates fat metabolism and aid in

weight reduction and reduce cholesterol levels. The fibre present in little millet prevents constipation and improve gut health. Its low glycaemic index (GI-64.2) ensures a slow release of sugar into the blood stream, maintaining normal blood sugar level and helping to control appetite. Phytates in little millet have anti diabetic effects. Phenolic compounds in little millet show anti-oxidant property which help prevent metabolic disorders like obesity, diabetes, cardiac diseases^[10,11].

In this study, *Peya* (gruel) as the mode of administration due to its lightness and easy digestibility aid in maintaining proper digestion. Moreover, it enhances the palatability of the preparation.

Thus, the components in *Yava Syamaka Peya*, with their properties like *Rukshana*, *Soshana*, and *Lekhana*, help eliminate excess *Kapha* from the *Srotas* and optimize *Dhatwagni* function. When *Dhatwagni* operates effectively, it leads to the normal formation of *Medodhathu*, thereby preventing improper deposition of fat in various areas of the body.

Probable mode of action of Suryanamaskara

Yoga harmonizes the physical body with the mind, offering a holistic approach that alleviates stress, anxiety, and depression linked to work and everyday life. Since stress is the major cause of almost all the disorders, regular involvement in *yoga* and *Pranayama* may help in its prevention and cure.

Suryanamaskara is both a physical as well as a spiritual practice. *Suryanamaskara* is a sequence of 12 *Asanas* performed in sync with breath^[12]. It consists of *Asanas*, *Pranayama*, meditation and *Mantras*. Each posture effectively stretches the spinal column, loosens major joints, and tones the skin and muscles. It also provides a beneficial massage to vital organs, promoting their stimulation. When performed dynamically, *Suryanamaskara* serves as an excellent cardiovascular workout by enhancing blood circulation and also helps in weight loss. When performed in a slow pace it enhances flexibility, tones muscles of the body and relaxes the body. In individuals with overweight the various postures of *Suryanamaskara* effectively stretch and compress the whole-body, offering a massaging effect that enhances blood circulation to that particular region, which can aid in fat loss while fostering muscle growth.

The initial pose in *Suryanamaskara* known as *Pranamasana* brings a state of concentration and calmness to mind. It relaxes the mind from anxiety and stress. By maintaining the erect posture with the spine straight there occur normal flow of *prana* throughout the body. Next posture *Hasthauthanasana* expands the chest and intercostal muscles helping in maximum intake of oxygen and help increase lung capacity. It also stretches and strengthens the abdominal muscles. *Padahasthasana* massages the abdominal area and help alleviate flatulence, constipation and indigestion. Also help reduce abdominal fat. Spinal nerves are stimulated and toned. Strengthens the spine, increases vitality and improves the metabolism. It stretches the hip, hamstrings, and calves and strengthens and tones the thighs and knees. *Aswasanchalanasana* tones the abdominal organs like liver, kidney. Relieves indigestion and constipation. Strengthens and increases flexibility of the spine and help increase the lung capacity due to expansion of the chest. *Dwipadaprasaranasana* tightens and strengthens the core muscles and the pressure created in the abdominal area improves the functioning of abdominal organs and aid in proper digestion. Stretches the arms, chest, shoulder, and spine. *Sasankasana* help improve digestion. Tones abdominal muscles, stretches and strengthens the arms, shoulders and upper back. Strengthens the thighs, knees and ankles. *Astanganamaskara* strengthens the muscles of upper and lower extremities, develops the chest and exercises the region of the spine between the shoulder blades. *Bhujangasana* tones and massages the abdomen and help in reducing the fat in abdominal area. Also improves digestion and cures constipation. Supports respiratory, digestive, reproductive and urogenital systems helping in its normal function. *Parvathasana* strengthens and tones the muscles in the back and limbs.

Suryanamaskara stimulates the *Pingala nadi* (*Surya nadi*) which can be compared to the parasympathetic nervous system in the body^[13]. This stimulation raises body heat, enhancing metabolism by regulating *Agni*; and reduces excess *Kapha* and *Medas*, thereby helping to lower body weight as well as cholesterol and sugar levels. Elevated stress levels trigger the secretion of cortisol, which leads to the accumulation of visceral fat and contributes to abdominal obesity. *Suryanamaskara* also have action on calming mind and thereby reducing stress level. Also abdominal obesity is a significant factor in insulin resistance, which can lead to diabetes. The massaging effect of the *Suryanamaskara* postures improves blood circulation, which in turn stimulates pancreatic beta cells to produce more insulin, facilitating proper glucose absorption by the body's cells.

CONCLUSION

Yava (barley) and *Syamaka* (little millet), key ingredients in *Peya*, possess *Kapha-medohara* properties that support *Srotosodhana* and help regulate *Dhatwagni*. This medicated diet is low in calories but rich in nutrients. *Suryanamaskara* enhances metabolism, aids in digestion, promotes the optimal functioning of internal organs, and contributes to physical fitness. Additionally, it calms the mind and promotes mental well-being.

The administration of *Yava Syamaka Peya* and *Suryanamaskara* resulted in significant reductions in weight, BMI, and waist-hip ratio among overweight participants. Significant improvements were also observed in fasting blood glucose and total cholesterol levels. The study found a considerable reduction in body weight, with an average loss of 6.646 kg over three months. Participants experienced an average decrease of 2.645 kg/m² in BMI and a reduction of 0.035 in waist-hip ratio. Additionally, fasting blood sugar (FBS) decreased by 14.71 mg/dl, and total cholesterol levels dropped by an average of 23.42 mg/dl. Based on these findings, it can be concluded that the intake of *Yava Syamaka Peya*, along with *Suryanamaskara* practice for three months, is effective in reducing overweight.

Thus, the null hypothesis was rejected, and the alternate hypothesis "Daily intake of *Yava Syamaka Peya* along with *Suryanamaskara* has an effect on overweight adults with a BMI of 25–29.99 kg/m² within the age group of 25–50 years" was accepted. Therefore, *Yava Syamaka Peya* combined with *Suryanamaskara* can serve as an effective lifestyle modification for weight management and help prevent potential complications.

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