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Efficacy of Yoga Practices on Waist to Hip Ratio among Obese People

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Abstract: The ultimate goal of practicing Yoga, as the name implies, is to achieve a sense of balance between the body and the mind, which leads to self-enlightenment. Yoga uses a variety of bodily postures, breathing techniques, relaxation exercises, and meditation to achieve this purpose. Different forms of exercise are used to reduce obesity. This research was designed to investigate the waist-to-hip ratio using different yogic practices in sedentary people. An empirical study was performed on sedentary people (n = 96) aged 30–55 years. The subjects were categorized into Treatment Group I (Suryanamaskara) (n = 24), Treatment Group II (Selected Asana) (n = 24), Treatment Group III (Mudra and Kriya) (n = 24), and the IV group (no yoga practice) named as the control group (n = 24). During twenty weeks of practicing various yogic practices, each participant in all four groups was pre- and post-tested on waist circumference. There were no significant differences in waist-to-hip ratio for sedentary people due to a reduction in both hip and waist circumference. This empirical study indicates that regular yogic practices in sedentary people will be beneficial for reducing waist circumference. Based on the findings and within the limitations, it was concluded that participation in twenty weeks of yoga practice had an impact on obesity. It is suggested that further studies should be conducted with different populations and variables.

Keywords: Yoga, Suryanamaskara, Asana, Mudra, Bandha, Waist circumference

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Introduction

In 1948, the World Health Organisation, in its preamble, defined health as -- A state of complete physical, mental and social well-being and not merely absence of disease or infirmity. In this definition, among the three components of health, the physical aspect is prime important and concerned with the body and deals with the

effective functioning of all systems and their efficiency. Physical health is direct. The NHLBI and the Rochester Medical Center in New York have identified the top 10 health concerns for 2020. Overweight and Obesity occupy the second top position in this list, which clearly shows the fast-growing issue of obesity as a major health

issue in the modern era (Hruby and Hu, 2015).

There are several exercise methods (forms). Wrestling, boxing, weightlifting, and other forms of vigorous exercise are examples. They are exhausted. Running, sit-ups, and push-ups are examples of exercises that involve repeating the same physical movement. These practices are extremely exhausting. On the contrary, Yogic Asanas may be performed by both young and older adults (Cramer *et al.*, 2016). In this study we selected Suryanamaskara, Asana, Mudra, and Kriya as independent variables to build three unique Yogic inventories for this study.

Materials and Methods

Selection of subjects:

A survey was conducted at several offices in Kannur District to measure employees' waist circumference, weight, and height. 600 Sedentary people with a waist circumference of more than 36 inches were identified from the data. One hundred fifty participants agreed to take part in a 20-week yoga program. The study's ninety-six inactive adults (N=96) with waist circumferences of more than 36 were chosen using a random sample procedure. All of the subjects had never received any type of physical exercise training previously and were divided into four equal groups: Suryanamaskara (SNG), Selected Asana (SAG), Mudra and Kriya (MKG), and Control Group (CG).

Variables:

In the present study, the dependent or response variable is the waist-hip ratio, and the independent variables are Suryanamaskara, Selected Asanas, and Selected Mudras and Kriyas.

The experimental design:

This study was designed with a genuine random group design. Ninety-six individuals (n=96) were randomly allocated equally (n=24) to four groups: treatment group I (Suryanamaskara) (n =24), treatment group II (Selected Asana) (n =24), treatment group III (Mudra and Kriya) (n =24), and control group (n =24). For twenty

weeks, treatment groups engaged in various yogic practices, with instruction provided six days a week. The draw-of-lots approach was used for random allocation. The data for the study were gathered using conventional techniques. Pre-tests were administered before the study, and post-tests were administered at the end of the twenty weeks of study for all three experimental groups and one control group. The acquired data was statistically analyzed using SPSS 27.

Data Collection:

Before the training and after twenty weeks of training, data were collected using the proper test protocols, and the information was used for the goal of the study. It was necessary to educate the researcher on the study's aim, as well as the specifics of the test to be utilized and the protocols to be followed before the tests could be administered to participants.

Administration of training programme:

In this study (Table 1), the yogic intervention was delivered to the Suryanamaskara group SNG (n=24), the Selected Asana group SAG (n=24), and the Mudra and Kriya group MKG (n=24). There has been no training provided to the Control Group (CG (n=24)). A total of twenty weeks (six days per week) was spent in the training. After every month, the duration of the session was lengthened by 5 min (The first month is 25 min, and the fifth month is 45 min). Authentic traditional Yoga texts were used in the construction of the specialized yoga inventory.

Administration of Test:

Purpose: To measure the waist-hip ratio.

Equipment: A flexible tape measure is all that is required for this technique.

Procedure: A Gulick II tape measure is useful because it applies a constant amount of tension to the tape, removing variability between examiners. Measured the waist circumference around the smallest part of the waist, which is usually 1 inch (2.54 cm) above the navel. Measure the circumference of the hips around the widest

Table 1: Model - Yoga Intervention for First Week of Treatment

Treatment Groups	Contents of Inventory			
	Warming Up 6 min	Treatment 15 min		Intensity
SNG	Stretching of Major Muscles	12 steps of Suryanamankara with slow movements		(6 rounds) 1 round @2 min 30 sec rest in between
SAG	Stretching of Major Muscles	Uddida Padasana Pavanamuktasana Pashchimotanasana	Dhanurasana Ustrasana	(3 rounds) Holding 20 sec 40 sec rest in between
MKG	Stretching of Major Muscles, Deep Breathing	Yoga mudra Viparitkarani Kapalabathi		(3 rounds) Holding 20 sec 40 sec rest in between (4 rounds) 20 strokes in 1 min and 1 min rest in between
CG		----- No Training -----		

Table 2: Descriptive statistics of waist-hip ratio score of all samples

Score	N	Mean	SD	Min	Max	Range	Skewness	Kurtosis
Pre-test	96	1.010	0.04	0.95	1.09	0.14	0.101	-1.072

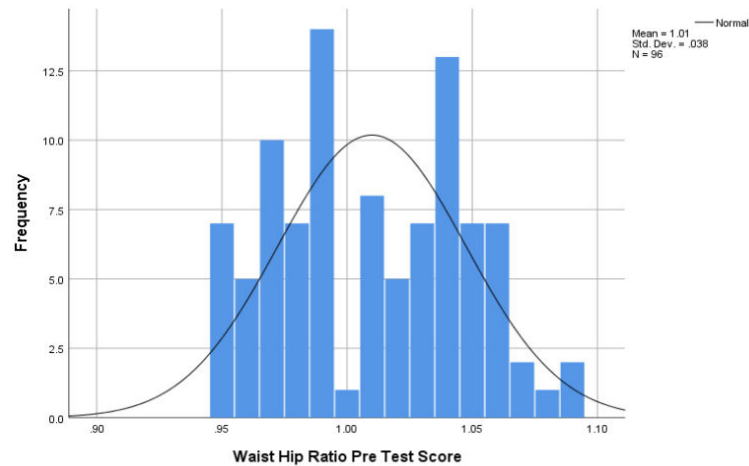


Fig. 1: Normality score of waist-hip ratio.

part of the buttocks (with minimal clothing).

Scoring: The waist-hip ratio (WHR) is computed as waist circumference (cm or in.)/hip circumference (cm or in.) and is expressed with no units because they cancel each other out during the division process.

Results and Discussion

From Table 2 we can see the skewness is 0.101 and the kurtosis is -1.072. The skewness and

kurtosis fall within -2 and +2, which indicates the distribution is normal.

It is evident that most of the distributions of pre-test scores of the Waist-hip ratio are falling appropriately with the normal curve, which indicates the scores are normally distributed (Fig. 1).

Table 3 displays the homogeneity of variance between the pretest scores of all four groups; the p-value is not less than 0.05, the H_0 is retained,

Table 3: Levene's homogeneity of variance of waist-hip ratio among all four groups

Variable	df between	df within	F ratio	p-value
Waist hip ratio	3	92	1.171	0.325

$F_{0.05(3,92)}=0.722, p>0.05$

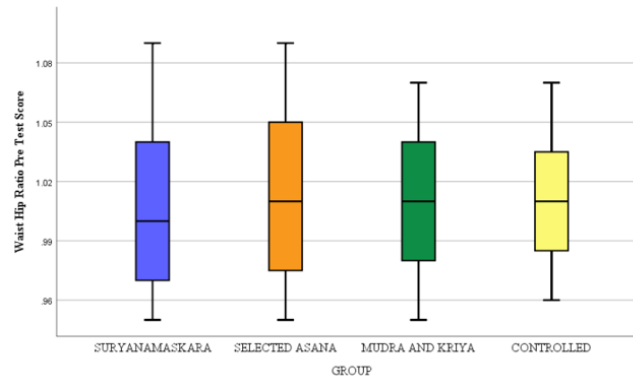


Fig. 2: Homogeneity of variance of the waist-hip ratio of all four groups.

Table 4: Paired sample t-test on waist-hip ratio of different treatments and control group

Groups	Pre-Test		Post-Test		MD	t	p-value
	M	SD	M	SD			
SNG	1.009	0.04	1.007	0.04	0.002	1.22	0.233
SAG	1.010	0.04	1.006	0.04	0.004	2.09	0.047*
MKG	1.010	0.04	1.009	0.03	0.002	1.07	0.295
CG	1.010	0.03	1.011	0.03	-0.001	-0.65	0.524

SNG- $t_{0.01(1,23)}=1.22, p=0.233$; SAG- $t_{0.01(1,23)}=2.09, p=0.0047$;
MKG- $t_{0.01(1,23)}=1.07, p=0.295$; CG- $t_{0.05(1,23)}=-0.65, p=0.524$

Table 5: Analysis of covariance on the waist-hip ratio between groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Pre-test	0.121	1	0.121	1612.15	0.00*
Group	0.000	3	0.000	1.584	0.199
Error	0.007	91	7.517E-5		
Corrected Total	0.128	95			

$F_{0.05(3,91)}= 1.584, p= 0.199, p>0.05$

and it concluded that the groups are homogeneous.

Figure 2 above displays a box and whiskers plot to display the distribution of variance across the groups. It is evident from the figure that all four groups are homogeneous.

The results (Table 4) of the study revealed that after twenty weeks of different Yogic interventions, only the selected asana group showed a significant difference in waist-hip ratio ($p < 0.05$). There is no change in the pre- and post-test of the control group; the mean difference score (MD = -0.001) p-value is 0.524, $p > 0.05$, as shown in Table 3. It is evident from the table that the margin of reduction in the waist-hip ratio is more MD 0.004 in the selected asana group, followed by MD 0.002 in the suryanamaskara and mudra and kriya group.

Dependent variable: Waist hip ratio Post Test Score:

In Table 5, no significant difference was noticed in the mean waist-hip ratio [$F(3,91)=1.584, p=0.199$] between all four groups. Since the p-value is above 0.05, there are no significant changes in waist-hip ratio among the four groups.

In Table 2, descriptive statistics displayed normality test for the pre-test data of all groups; it is evident from the table that the scores of all three-treatment groups and the control group satisfied Normality. Table 3 elucidates that the skewness and kurtosis of all groups falling within -2.00 and +2.00, so all samples in all four groups are normal, and the variables with each group are homogeneous.

Table 3 Levene's homogeneity of variance displays that the variances of all four groups on scores of waist-hip ratios are homogeneous. That's why the researcher chose parametric tests like paired sample t-tests and ANCOVA for interpreting the data and analyzing the scores.

Table 3 elucidates the difference in mean scores of waist-hip ratios of all groups. Results demonstrate that after twenty weeks of different

Yogic interventions, there was not much difference in waist-hip ratio. It is evident from the table that the mean difference is only marginal. The reason for these results, after the treatment, the experimental groups reduced the waist and hip circumference (Anheyer *et al.*, 2021). Since the formula of waist-hip ratio is waist circumference/hip circumference, both the numerator and denominator reduced simultaneously and overall change in ratio did not occur.

Conclusion

All three yogic interventions administered in this study can be used for the reduction of waist circumference and fat percentage. Practicing Suryanamaskar or selected asana for twenty weeks can reduce waist circumference and fat percentage. Results demonstrate that after twenty weeks of different Yogic interventions, there was not much difference in waist-hip ratio. It is evident from the table that the mean difference is only marginal. Practicing Suryanamaskara or Selected Asana for twenty weeks can reduce abdominal obesity. The results of the study provide a message that Yogic practices have a positive effect in reducing abdominal obesity hence, in light of the conclusion, the following recommendations are made:

- Other Yogic practices can be used as an independent variable for the same dependent variables for the obese population.
- All yogic interventions used in this study are cost-effective, safe, and feasible, so it is strongly recommended for all people.
- These healthy yogic practices can be done along with medical treatments under the supervision of a yoga expert.

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