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## EFFECT OF YOGIC PRACTICES ON SELECTED PHYSICAL VARIABLES AMONG HYPERTENSIVE PATIENTS

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**Abstract:** The purpose of the study was to investigate the therapeutic effects of yogic practices on selected physical variables viz., Weight, B.M.I. (Body Mass Index) among essential hypertensive patients. The subjects chosen for this study were divided into experimental and control group consist of 45 samples each, both male and female patients in the age group between 40 years and 60 years with Grade - I (mild) and Grade - II (moderate) hypertensive patients. From the study, it is observed that the application of yogic practices would reduce weight in case of experimental group compared to control group and the BMI (Body Mass Index) would hold a marginal change due to yogic practices between baseline period and different phases of training and follow-up period in case of experimental group compared to control group. The findings of the study indicated that there is no improvement and the weight almost remained the same and in the experimental group the B.M.I. level decreasing due to yogic practices, but in the case of control group, it keeps increasing throughout the observation period.

**Keyword:** Weight, Body Mass Index, Hypertension.

### INTRODUCTION:

Yoga is a philosophical science, born out of man's seeking to fathom the meaning of existence. Yoga is derived from the Sanskrit word 'Yuj' which means 'union' or to 'join' or 'to yoke'. Yoga is a powerful, internal experience, which integrates the body, the senses and the mind with the self. Sage Patanjali, the Father of Yoga, said in the second sutra of Samadhi Pada, "Citta-Vrtti-Nirodhah" means, "The restraint of the modifications of the mind is yoga". The ultimate aim of yoga is self-evolution. In ancient times, people lived the yogic way and were having good health. In these days when health deteriorated due to man's changing values and lifestyle yoga gained ground in its use as therapy.

### HYPERTENSION

According to Medilexicon's medical dictionary, hypertension means high blood pressure. "Blood pressure is defined as the lateral pressure exerted by the column of blood on the wall of arteries. Blood pressure means the arterial pressure. The arterial pressure fluctuates during systole and diastole of the heart".

The present study was undertaken to investigate the therapeutic effects of yogic practices on selected physical variables among essential hypertensive patients. The Rajah Muthiah Medical College Hospital, Annamalai University, Annamalaiagar, Chidambaram is taken for the experimental research with regard to hypertensive patients with the concurrence of Human Ethical Committee of the University.

### OBJECTIVE OF THE STUDY

The OBJECTIVE is to identify the effect of yogic

practices on physical variables among hypertensive patients. For this situation experimental study is most suitable.

### METHODS

Since the study is experimental in nature, convenient random sampling method was applied. There were 90 subjects who have accepted for the study were divided into experimental and control group consist of 45 samples each, both male and female patients in the age group between 40 years and 60 years with Grade - I (mild) and Grade - II (moderate) hypertensive patients were selected for the study.

For this purpose, two groups viz., experimental and control groups are observed. The observations of various measures are taken at pre test level. Experimental group members are exposed to yogic practices (Asana, Pranayama, Mudras, Relaxation Techniques and Meditation and Diet advice given to all the subjects undertaken for the study by Senior Dietician of Rajah Muthiah Medical College Hospital, Annamalai University) for the period of 6 months along with Drug, six days in a week of one hour duration and follow up period for 6 months, yoga training is given once in a week of one hour duration. They are observed at every three months interval i.e. after 3 months & 6 months and follow up periods; 9 months & 12 months. Similar to experimental group, though they are not exposed to yogic practices but they are taking only drugs and they are also observed at the same interval.

### STATISTICAL METHODS USED

To analyze and interpret the effects of yogic practices as a therapy on selected physical variables viz.,

Weight & B.M.I. (Body Mass Index) among essential hypertensive patients, SPSS package, ANOVA and other appropriate statistical tools were used for analysis.

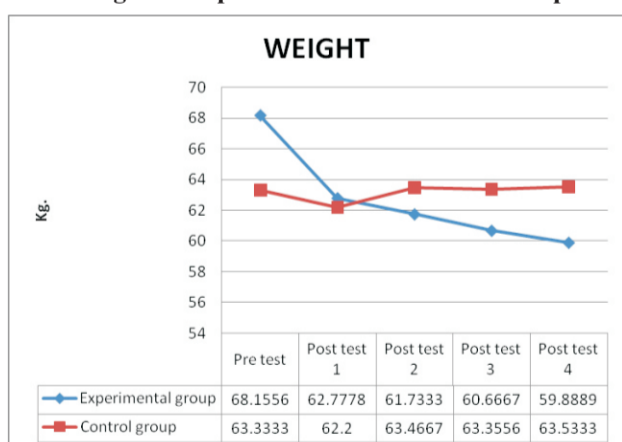
**Table – 1**  
**Mean and (S.D.) of Weight of Experimental and Control Groups**

Testing Condition	Experimental group	Control group
Pre test	68.1556 ± 20.32	63.3333 ± 9.94
Post test 1	62.7778 ± 11.30	62.2000 ± 12.52
Post test 2	61.7333 ± 11.36	63.4667 ± 9.37
Post test 3	60.6667 ± 11.20	63.3556 ± 9.72
Post test 4	59.8889 ± 10.72	63.5333 ± 9.61

Table 1, consolidates mean and standard deviation of weight of the respondents of both experimental and control group. In the experimental group the mean value is 68.1556 kg. The weight during third, sixth, ninth and twelfth month are 62.7778, 61.7333, 60.6667 and 59.8889. Hence, it is observed that the weight of the sample gradually reduced from the base line stage to the last stage of observation.

Comparing the mean values in the control group it was almost the same during all the phases. In the base line stage the average weight of the respondents is 63.3333. It reduced to 62.2000 at the end of third month. But, it increased to 63.4667 at the end of sixth month. Observing the ninth month average weight, it slightly reduced to 63.3556. But the standard deviation level got increased compared to the sixth month. At the end of the year it further raised to 63.5333. So, in general there is no improvement and the weight almost remained the same.

**Figure 1**  
**Weight of Experimental and Control Group**



**Table – 2**  
**Summary of ANOVA for 2 × 5 factorial experiments with repeated measures on the last factor on Weight**

Source of Variation	SS	df	MS	F	Sig
<b>Between Ss</b>					
A (Groups: Experimental and Control)	32.000	1	32.000	0.063	NS
Ss w. groups (Error I)	44898.844	88	510.214		
<b>Within Ss</b>					
B (Different phases of testing conditions)	949.756	4	237.439	4.517	0.05
AB	1027.844	4	256.961	4.889	0.05
B × Ss w. groups (Error II)	18502.000	352	52.562		

\*Significant at 0.05 level

The table value required for significance at 0.05 level of confidence with df of 1 and 88 is 3.963 and df of 4 and 352 is 2.37.

In table 2 the result of repeated measures ANOVA for the weight based on two groups and five stages are presented. F-value for experimental group 0.063 which is less than 3.963 at 5% level for (1 and 88) df It is interfered that there is no significant differences in the weight between experimental and control group. Further, test is also carried out to identify whether there is any variation in the weight within the group. The F-Value is 4.517 and it is found to be significant because it is greater than 2.37 at 5% level with (4 and 352) df So, the weight varies among the five stages within the group. Apart from that, F-value for interaction effect is 4.889 which is also significant at 5% level with df (4 and 352). This implies that there is interaction effect of groups on various stages of observation on weight.

**Table – 3**  
**Simple effect test on Weight**

Factors	SS	df	MS	F
Groups & Pre test	523.228	1	523.228	9.954492*
Groups & Post test 1	7.511689	1	7.511689	0.142911
Groups & Post test 2	67.6052	1	67.6052	1.286199
Groups & Post test 3	162.6791	1	162.6791	3.094995
Groups & Post test 4	298.8372	1	298.8372	5.685422*
Tests & Experimental group	480.6596	4	120.1649	2.286156
Test & control group	13.74446	4	3.436114	0.065373
Error	18502	352	52.562	

\* Significant at 0.05 level.

The table value required for significance at 0.05 level of confidence with df of 1 to 352 is 3.84 and df of 4 and 352 is 2.37.

Test is also carried out to identify whether there is any significant difference in the weight at various phases of study between groups and also individually and the result is shown in table 3.

The difference between the experimental and control group is 9.954492 and it is observed to be significant

at 5% level because it is greater than 3.84 at the base line. There is difference in the average weight of experimental and control group at base line.

Comparing the weight of experimental and control group during the observations at the end of third, sixth and ninth month did not vary significantly, because the corresponding value is 0.142911, 1.286199 and 3.094995.

After twelve months, again there observed a significant level of difference in the weight between the experimental and control group. The F-value is 298.8372 and higher than 2.37 at 5% level for (1 and 352) df The weight differ considerably between experimental and control group during the last phase of study i.e., at the end of the year.

Further, the test to study variation between experimental and control group resulted in F-value 2.286156 and 0.065373. It is not found to differ significantly. So, there is no difference in the weight among the different phases of experimental group. Similar is the situation among the control group also.

**Table –4**  
**Scheffé S test for difference between paired means on Weight of Experimental Group**

Different phases of testing conditions					MD	CI	%
Pre	Post 1	Post 2	Post 3	Post 4			
68.1556	62.7778				5.3778*	4.74	7.890
68.1556		61.7333			6.4223*	4.74	9.422
68.1556			60.6667		7.4889*	4.74	10.987
68.1556				59.8889	8.2667*	4.74	12.129
	62.7778	61.7333			1.0445	4.74	1.663
	62.7778		60.6667		2.1111	4.74	3.362
	62.7778			59.8889	2.8889	4.74	4.601
		61.7333	60.6667		1.0666	4.74	1.727
		61.7333		59.8889	1.8444	4.74	2.987
			60.6667	59.8889	0.7778	4.74	1.282

\* Significant at 0.05 level.

By applying Scheffe' S test paired difference in weight between taking two at a time is made and the results are shown in table 4.

The percentage of weight reduction from base line to every three months gap are 7.890, 9.422, 10.987 and 12.129. It is observed the weight reduced step by step during the study period.

Comparing the base line weight with four stages viz., third, sixth, ninth and twelfth the values are 5.3778, 6.4223, 7.4889 and 8.2667. There is significant difference in the weight between base line stage with that of the four stages of observation during experimental study.

But, consequently there is no considerable level of difference between third month weight with regard to sixth, ninth and twelfth month. Sixth month deviation with ninth and twelfth are 1.0666 and 1.8444. These values also do not differ significantly. Ninth month weight with twelfth month also does not vary significantly because the deviation is 0.7778.

So, only the base line value differed with the other four phases of observation in the case of experimental group.

Also comparing weight during the five phases it is also noticed that the highest weight is only during the pre-test period and reduced consequently to the last phase of observation throughout the study period.

**Table – 5**  
**Scheffé S test for difference between paired means on Weight of Control Group**

Different phases of testing conditions					MD	CI	%
Pre	Post 1	Post 2	Post 3	Post 4			
63.3333	62.2000				1.1333	4.74	1.789
63.3333		63.4667			0.1334	4.74	0.210
63.3333			63.3556		0.0223	4.74	0.035
63.3333				63.5333	0.2	4.74	0.315
	62.2000	63.4667			1.2667	4.74	2.036
	62.2000		63.3556		1.1556	4.74	1.8574
	62.2000			63.5333	1.3333	4.74	2.143
		63.4667	63.3556		0.1111	4.74	0.175
		63.4667		63.5333	0.0666	4.74	0.104
			63.3556	63.5333	0.1777	4.74	0.280

\* Significant at 0.05 level.

Table 5 shows average weight variation of the study period. The weight reduced in the first phase and then it is higher than base line. First it reduced by 1.79 % and started increasing and the percentages are 0.21, 0.04 and 0.32.

Similarly the paired test is carried out for the control group also and the test results are tabulated in table 5. Comparing the mean values of base line with the follow up stages of third, sixth, ninth and twelfth month it is observed that the deviation levels are 1.1333, 0.1334, 0.0223 and 0.2. These values do not differ significantly. It implies that there is no significant difference between base line and other period.

Similarly there is no significant difference in the weight of third month with the other three phases and so on.

On the whole, there is no variation in the weight of the control group in all the phases of this study. It almost remains the same.

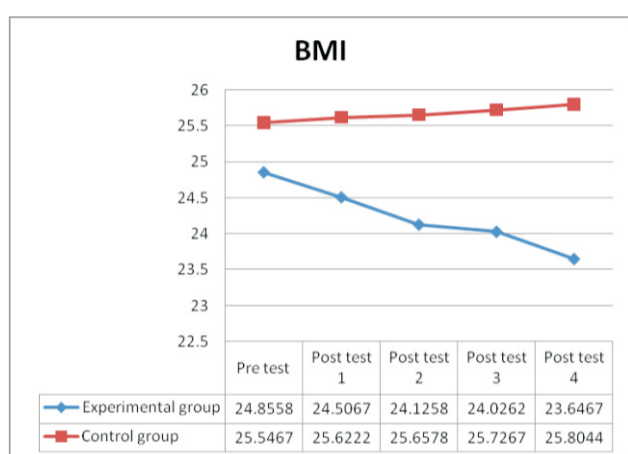
**Table – 6**  
**Mean and (S.D.) of BMI of Experimental and Control Groups**

Testing Condition	Experimental group	Control group
Pre test	24.8558 ± 2.94	25.5467 ± 3.64
Post test 1	24.5067 ± 3.07	25.6222 ± 3.52
Post test 2	24.1258 ± 3.05	25.6578 ± 3.62
Post test 3	24.0262 ± 3.89	25.7267 ± 3.79
Post test 4	23.6467 ± 2.92	25.8044 ± 3.71

In table 6 BMI average and standard deviation in both experimental and control group. In the experimental group the base line BMI average is 24.8558. At the end of every three month for a period of one year the trend is

decreasing viz., 24.5067, 24.1258, 24.0262 and 23.6467. But, in the case of control group the base line value is 25.5467. Further the BMI average level keep increasing. The average value during every month period are 25.6222, 25.6578, 25.7267 and 25.8044. In the case of experimental group the BMI level keeps decreasing due to yogic practices. But, in the case of control group it keeps increasing throughout the observation period.

**Figure 2**  
**BMI of Experimental and Control Group**



**Table – 7**  
**Summary of ANOVA for 2 × 5 factorial experiments with repeated measures on the last factor on BMI**

Source of Variation	SS	df	MS	F	Sig
<b>Between Ss</b>					
A (Groups: Experimental and Control)	40.590	1	40.590	0.134	NS
Ss w. groups (Error I)	26748.168	88	303.956		
<b>Within Ss</b>					
B (Different phases of testing conditions)	1815.645	4	453.911	1.925	NS
AB	1781.173	4	445.293	1.889	NS
B × Ss w. groups (Error II)	82991.238	352	235.771		

\*Significant at 0.05 level

The table value required for significance at 0.05 level of confidence with df of 1 and 88 is 3.963; and df of 4 and 352 is 2.37.

ANOVA test for repeated measures for BMI is carried out and the result is shown in table 7. The variation between experimental and control group is tested and the F-value is 0.134. This value is not found to be significant at 5% level for the df(1 and 88). So, there is no variation in the BMI level between experimental and control group.

The F-value for the variation within the group is found to be 1.925. This also does not vary considerably within the group at 5% level with df(4 and 352).

The effect of groups with various phases of this study is also not found to be significant. There is no interaction effect of groups with various phases of study. So,

on the whole there is no considerable level of variation with respect to BMI.

**FINDINGS**

**Weight**

Average weight of experimental group was at its maximum at base line and was found to be decreasing stage after stage. In the control group, the average weight reduced at first phase. After the third month it was found to be increasing and sustained the increase till the end of the period under observation.

The weight between experimental and control group was not found to be statistically significant. The weight among the five phases of observation did vary significantly and also there was an iteration effect of groups during the different phases of the present study.

The weight of the members among various phases was found to be different at base line level and at the end of the twelfth month. Apart from that there is no significant difference in the weight level.

Average weight of the experimental group was found to be decreasing stage by stage. On an overall comparative look, base line average value was at the highest. The results of all four phases of the year under observation was found to be statistically significant. Excepting that of the base line weight no other weight differed significantly with during the subsequent phases. Though there is reduction of weight and the difference after third month, it was found that it was not statistically significant.

Average weight of the members under control group showed a decrease in the first phase but started increasing in the subsequent phases. The only incidence of weight loss that occurred during the first phase, when compared to the base line weight measurement was not found to be statistically significant. On the whole there was, to a considerable level, no change in weight during the period of study. Though the weight of the members was fluctuating, the group average was more or less the same.

The findings of Bera and Rajapurkar (1993) shown that there was a significant improvement ideal body weight after the yogic practices. This is not fall in line with his study. This is due to specific yoga for weight reduction and also the samples were not patients.

**BODY MASS INDEX (B.M.I.)**

The average B.M.I. of experimental group was at its high during base line stage and it was found to decrease stage by stage. But, in the case of control group at every phase the B.M.I. level showed an increasing trend.

Further, it is found that there was no significant difference in the average B.M.I. level between experimental and control group. Also there is no considerable level as difference in the B.M.I. level among members of study and also there is no iteration effect of groups on the stages of study. It is finally observed that B.M.I. level remains almost the same during the period of study both in the case of experimental and control group.

The findings of McCaffrey. R., et al. (2005) shown that there was a significant improvement Body Mass Index after the yogic practices. The findings differ from the finding

of this study this might be due to longer period of yoga practices.

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