

OBSERVED CHANGES IN THE ATTITUDE OF ESSENTIAL HYPERTENSIVE PATIENTS AFTER JOINING NATUROPATHY CENTRES

Nutan

Assistant Professor, Department of Food and Nutrition, Bhagat Phool Singh

Mahila Vishvavidyalaya Khanpur Kalan, Haryana, India

Received: 04 Apr 2018

Accepted: 21 Jun 2018

Published: 30 Jun 2018

ABSTRACT

Alternative therapies used regularly at naturopathy centers for treating hypertensive subjects. Alternative therapies are having the synergistic effect in reducing hypertension like Exercise (Imperceptible exercises, Breathing Exercise, Pranayam, Yogasanas Massage, Music therapy, Meditation, Vipassana, Hydro therapy, Mud therapy, Color therapy, Acupressure etc. hypertension is a common disease affecting masses. Most of the people are educated enough to understand their health pursuits. So, the patients suffering from hypertension are nowadays preferred to get themselves treated from naturopathy centers. The present study is an effort to assess the changes in nutritional and health status experienced by the patients after joining naturopathy centers.

In naturopathy center patient were doing meditation, yoga, sun, air, water and mud therapy and were given hypo-caloric diet. For the purpose of study 30 hypertensive male and the equal number of the female were selected from naturopathy center namely Prakritik Jeevan Kendra, Pattikalyana, G.T. Road, Panipat and Navneet Prabhakar Yog Chikitsa Dham, Bassi, Jaipur, Rajasthan. Weight, height as well as BMI, WHR and nutrient intake was calculated before and after getting the treatment from naturopathy center. Treatment from naturopathy center was effective in reducing the weight (male 8.79 ; female 10.84 per cent) and BMI(from 25.16 to 22.95 in male and 28.07 to 25.065 in female). After joining naturopathy center the consumption of salad, fruits, lemon, boiled vegetables, and water has increased whereas consumption of fried snacks, sugar, cold drink and full cream have been stopped completely. All the patients have reported a positive feeling of mental and physical fitness after joining naturopathic treatment.

KEYWORDS: *Pranayam, Yogasanas Massage, Music Therapy, Meditation, Vipassana, Hydro Therapy, Mud Therapy, Color Therapy, Acupressure*

INTRODUCTION

Hypertension, an outcome of over competitive environment. About 80 percent of hypertensive patients has one or more risk factors like dyslipidemia, glucose intolerance, obesity and ventricular hypertrophy(Flamingham,2006). According to Joint National Committee VII criteria, the prevalence of hypertension and pre-hypertension was 27.7 and 56.3 percent, respectively and this increases with the age (WHO,2006). Hypertension may be cropped up as a result of sedentary life-style, excessive alcoholism, smoking, overeating and fast pace of tension loaded life.

Naturopathy attempts to completely change our lifestyle completely and successfully give the life a U-turn towards a better perception of health. It attacks all culprits responsible for hypertension. The consumption of snacks, with the fatty and salty content or the intake of fast food, is associated with the increased prevalence of hypertension (Psaltopoulou *et al* 2017).

Gupta *et al* (2017) studied that hypertension is present in 25-30% urban and 10-20% rural subjects in India. Approximately half of the two-thirds of these are stage 1 hypertension (systolic BP 140-159) and /or diastolic BP 90-99mm Hg). Obesity is thought to be along with smoking, the first preventable cause of death. Obesity is a traditional risk factor for CVD and it is well correlated with insulin resistance and hyperglycemia. Davidson (1980) considers naturopathy responsible for removal of ill health altogether by living according to the laws of nature. Naturopathy and yoga (an Indian system of medicine which emphasizes on lifestyle changes to prevent and cure diseases) may be well positioned to offer structured lifestyle interventions with low technological input, moderate cost and better patient acceptability (Khatib *et al* 2014). In India, various naturopathy centers have been set up for treating the patients suffering from hypertension and heart-related diseases. Therefore, the present study has been taken with the objective to assess the role of naturopathic lifestyle in providing better fitness feelings to the overburdened masses along with medical improvements.

MATERIALS AND METHODS

Sampling:

Purposive sampling technique was followed for collection of data, 30 hypertensive male and an equal number of the hypertensive female who enrolled themselves in naturopathy centers for the treatment of hypertension.

Location

Subjects were selected from naturopathy centers namely -Prakritik Jeevan Kendra, Pattikalyana, G.T. Road, Panipat and Navneet Prabhakar Yog Chikitsa Dham, Bassi, Jaipur, Rajasthan. The age of the subjects was between 40-60 years. This treatment was done in naturopathy centers for one month in naturopathy centers subjects were doing yoga (i.e. Exercise and pranayama). Along with this, they were undergoing mud, water, and diet therapies accordingly.

Dietary Survey

Meal pattern and intake of each subject as before and after attending the naturopathy center for one month for treatment was established by 24 hr recall method for three consecutive days. The total amount of raw & cooked food in the family was also noted during this duration. Based on the above data, the amount of raw food consumed by each subject was calculated as follows:

Amount of raw

Food consumed = Total quantity of raw - Individual

By individual $\frac{\text{food used by family}}{\text{Total quantity of Cooked food}} \times \text{intake of a cooked portion}$

Total quantity of Cooked food

Their **nutrient intake** was compared with the Recommended Dietary allowances given in the Nutritive value of Indian Foods (Gopalan, 2000).

Food Intake

Quantity of various foodstuff consumption was calculated like various seasonal fruits vegetables fats and sugars etc.

Anthropometry

Height, weight, waist and hip circumference of each subject was measured by using the method of Jelliffe (1966) before and after naturopathic treatment. BMI and WHR were calculated before and after the treatment of each subject by using the method of James et al (1988) as follows:

$$\text{BMI} = \frac{\text{Weight (kg)}}{(\text{Height in meters})^2}$$

$$\text{WHR} = \frac{\text{Waist in Cm}}{\text{Hip in Cm}}$$

The subjects were graded as per normal values and standardized tables.

Blood Pressure

After obtaining oral consent, blood pressure was measured on the left arm by the auscultatory method using mercury sphygmomanometer. The individual was made comfortable and seated at least for five minutes in the chair before measurement. Two readings were taken half an hour apart and the average of two was taken (Luepker *et al*, WHO,2004). Hypertension was defined as systolic blood pressure (SBP) >140 mmHg and diastolic blood pressure (DBP) >90 mmHg as per US Seventh Joint National Committee on detection, evaluation and treatment of hypertension (JNC VII) criteria. (2003)

Statistical Analysis

Data for height, weight, and BMI, WHR and lipid profile was statistically analyzed to calculate the mean, S.D. and paired t-test was used for difference of significance.

RESULTS AND DISCUSSIONS

Anthropometry

At the time of joining naturopathy center, all anthropometric parameters were above the ICMR (1999) standards.

Body Weight

Mean weight of the male and female subjects was 71.29 and 67.029 kg at the time of joining naturopathy center which decreased to 65.03 and 59.76 kg respectively, after joining naturopathy centers.

BMI

Mean BMI was 25.16 and 28.07 at the time of joining naturopathy center. Analysis of data further reveals that before joining the naturopathy center maximum subjects were at the risk of obesity and were obese of 1category (male 30%; female 19.8%) and category 2 obese(male 13.2 %; female 6.6 %). Overall subjects having below normal BMI(<18.5) were 6.6 percent and only 16.6 percent of subjects were falling under normal BMI range(18.5 to 22.9)Before naturopathy centers diet intake, the mean value of BMI in the essential hypertensive observation group of male, female and

total was 25.16 ± 3.95 , 28.07 ± 5.92 and 26.74 ± 5.22 kg/m² respectively which declined to 23.66 ± 3.72 , 26.16 ± 5.05 and 25.02 ± 4.58 kg/m² after 15 days and further went down to 22.95 ± 3.60 , 25.07 ± 4.68 and 24.10 ± 4.28 kg/m², respectively after 30 days of naturopathic diet intake.

Perception of the Essential Hypertensive Subjects after Joining Naturopathy Centers

Change Experienced

Out of the grand total population comprising of both male and female subjects, a major proportion (45%) of subjects reported the moderate change. A close to the same number (43.32 %) reported strong changes and only 11.66 percent reported the low change. However, none of the subjects had gone without experiencing any change after joining the naturopathy centers.

Table 1: Change Experienced by Essential Hypertensive Subjects after Joining Naturopathy Centers

Change	Male (n=30)		Female(n=30)		Total(N=60)	
	No. of Subjects	%Age	No. of Subjects	%Age	No. of Subjects	%Age
a. Change experienced						
Very much	8	26.66	18	60	26	43.32
Moderate	17	56.66	10	33.33	27	45
Very less	5	16.67	2	6.66	7	11.66
None at all	--	--	--	--	--	--
b. Benefit they got						
Increase in BP	--	--	--	--	--	--
Decrease in BP	30	100	30	100	60	100
Weight loss	30	100	30	100	60	100
Feeling of fitness	30	100	30	100	60	100

Benefit They Got

Interestingly, all of the subjects reported the desirable changes listed in the questionnaire like a decrease in blood pressure, weight loss and feeling of fitness after joining the naturopathy centers. Importantly none of the subjects reported an increase in blood pressure after joining the naturopathy center.

A look at the data contained in Table 1 clarifies that none of the subjects was beneficially unaffected from the experience of joining naturopathy center and most of them reported moderate or very much change and improvement in their blood pressure i.e. decline in the blood pressure to the normal levels.

Dietary Interventions Affected at the Naturopathy Centers for Essential Hypertensive Subjects

Food Consumption Pattern Changes Adopted at the Naturopathy Centers

It is clear that all of the subjects increased fluid or water intake. Out of them most of the subjects reported increased intake of fruits (96.63%) followed by lemon (94.96%), salad (80%), whereas only tenper cent of subjects increased apple intake. On the contrary, all of the subjects have decreased fat, sugar, cold drinks, fried snacks, full cream milk and salt intake. Moreover, changes in food consumption pattern of male and female essential hypertensive subjects were more or less identical.

Table 2: Distribution of the Essential Hypertensive Subjects on the Basis of Food Consumption Pattern Changes before Starting the Exercise

Change	Male (n=30)		Female(n=30)		Total(N=60)	
	No. of Subjects	%Age	No. of Subjects	%Age	No. of Subjects	%Age
Increased						
fruit	30	100	28	93.32	58	96.63
Boiled vegetable	20	66.66	18	60	38	63.31
Fat	--	--	--	--	--	--
Roti	--	--	--	--	--	--
Banana	--	--	--	--	--	--
Apple	2	6.66	4	13.33	6	10
Lemon	30	100	27	90	57	94.96
Water/Fluid intake	30	100	30	100	60	100
Salad	26	86.66	22	73.33	48	80
Decreased						
Fat	30	100	30	100	60	100
Sugar	30	100	30	100	60	100
Cold drinks	30	100	30	100	60	100
Fried snacks	30	100	30	100	60	100
Full cream milk	30	100	30	100	60	100
Salt	30	100	30	100	60	100

It can be summed up from the Table 2 that after joining naturopathy center the consumption of salad, fruits, lemon, boiled vegetables, and water has increased whereas consumption of fried snacks, sugar, cold drink and full cream have been stopped completely.

Blood Pressure

Systolic Blood Pressure (SBP): Before naturopathy centers consumption, schedules commencement the mean level of SBP in observation groups of essential hypertensive male, female and grand total populations comprised with both male and female subjects were 157.20 19.86, 166.99 23.83 and 162.51 22.27 mm/hg, respectively. According to JNC VII (2003), they were falling under the category of hypertension stage I (140-159 mm/hg) for male subjects and hypertension stage II (160-179 mm/hg) for female and total observation groups. Further, the SBP was comparatively higher for female observation group as compared to their male counterparts. So the mean level of SBP in all subjects was higher than the normal range. On diet intake the mean SBP of observational groups of males, females and overall population constituted with both male and female observation subjects turned 130.06±8.32, 124.79±6.06 and 127.20±7.58 mm Hg after 15 days and 124.56±5.05, 125.53±6.57 and 125.09±5.84 mm Hg respectively after 30 days.

The reduction in SBP was significant at various time intervals of the study for all observation groups but was non-significant at 15 to 30 days time period for the female essential hypertensive subject.

Diastolic Blood Pressure (SBP):

Prior to admission in the naturopathy center, the level of DBP in groups of male, female and a grand total population of both were 106.29±15.20, 104.81±11.62 and 105.49±13.25mm Hg, respectively. According to JNC VII (2003) all were falling under the category of hypertension stage II (100-109 mm/hg).

On naturopathy center diet feeding the mean DBP of the male, female and overall population constituted with both male and female subjects reduced to 94.50 ± 15.20 , 86.05 ± 6.06 and 89.91 ± 18.44 mm Hg after 15 days and 85.06 ± 5.72 , 83.58 ± 4.32 and 84.26 ± 5.01 mm Hg, respectively after 30 days. Among all observation groups, the mean DBP values were very close to each other at all duration of feeding and the difference was significant at both levels ($P \leq 0.01$) at all observation points for all the observation groups.

The combined results of SBP and DBP of the present investigation are in concurrence with the study of Edla et al (2016) as well as (http://www.myoclinic.com/health/fiber/NU_00033, 2008) the researchers evaluated the results of 25 studies on the blood pressure of adding fiber to the diet. Fiber intake (in the form of fruit, cereal, fiber pills and vegetables) in the studies ranged from 3.8 g/day to 125 g/day. Overall results showed that adding fiber to the diet was associated with a significant reduction in both systolic and diastolic blood pressure in people with high blood pressure. In studies lasting at least 8 weeks, the average reduction in blood pressure was 3.12 mmHg systolic and 2.57 mmHg diastolic. A small drop in both systolic and diastolic blood pressure reading was also seen in people without high blood pressure

Radhika et al. (2006) carried out a study with the aim to examine the association between legumes, fruits and vegetable intake and CVD risk factors in 1143 adult urban South Indians aged ≤ 20 years. Subjects consuming highest legumes fruits and vegetable intake have a significantly low prevalence of hypertension

Fruits and vegetables carry natural antioxidant, which is beneficial to our health, including improved cardiovascular health. (<http://www.jurugan.com,20/2/2007>). These fruits and vegetables are included in the diet of naturopathy centers.

On the basis of her studies on the effect of food-based antioxidants on a group of 60 coronary heart disease patients Sona et al. (2003) scientifically approved that dietary antioxidants comprising of Amaranthus gangeticus-100g; amla powder-10g; wheat germ 10g and one sweet lime is the antioxidant supplementation in the food form is a natural practicable aspect of dietary management of cardiovascular disease when followed on a day to day basis for two and a half month of supplementation.

Moreover, the dash diet, an eating plan that has been clinically proven and a popular method to lower blood pressure in hypertensive men and women, recommended eating of four to five servings from the nuts, oilseeds and legume group each week (Appel et al., 1997).

Efficacy Appraisal of the Dietary Interventions of Essential Hypertensive Patients at the Naturopathy Centers

Anthropometric Parameters of the Essential Hypertensive Human Subjects (A) at joining, (B) after 15 days and (C) after 30 days of naturopathic diet intake: The information related to average dimensions of major anthropometric variables of the subjects before and after joining naturopathy center are presented in Tables 4 to 5 and discussed as under:

Height: Table 4 reveals that the mean height of selected essential hypertensive male subjects was $1.68 \pm .062$ m and female was $1.56 \pm .087$ m and for the overall grand population it was $1.602 \pm .104$ m. It was lower than standard Indian height for the male but was similar to standard Indian height for the female.

Weight: Weight of all male and female subjects was higher in comparison to the weight of reference Indian men and women i.e. 60 and 50 kg respectively (ICMR, 1990). Prior to naturopathic dietetic involvement, the mean value of

weight in male-female and overall population groups was 71.29 ± 12.76 , 67.03 ± 18.72 and 68.98 ± 16.10 kg respectively, which reduced to 67.02 ± 11.84 (6.00%), 62.39 ± 16.24 (6.91%) and 64.51 ± 14.32 kg (12.35%) respectively after 15 days to 65.03 ± 11.64 (2.97%), 59.76 ± 15.22 (4.22%) and 62.17 ± 13.71 (3.63%) respectively after 30 days. The total weight loss was 8.80, 10.84 and 9.88 percent for male, female and total population, respectively after complete one month of stay at naturopathy centers. It has been observed from the Table 4 that the reduction in weight was more in female than in their male counterparts.

BMI: Before naturopathy centers diet intake, the mean value of BMI in the essential hypertensive observation group of male, female and total was 25.16 ± 3.95 , 28.07 ± 5.92 and 26.74 ± 5.22 kg/m² respectively which declined to 23.66 ± 3.72 , 26.16 ± 5.05 and 25.02 ± 4.58 kg/m² after 15 days and further went down to 22.95 ± 3.60 , 25.07 ± 4.68 and 24.10 ± 4.28 kg/m², respectively after 30 days of naturopathic diet intake. After looking at the Table 4, it has been found that the initial mean BMI for all the groups was under obese I category (i.e. 25-29.9 kg/m²) which fell down and the mean values after 15 days of naturopathic diet follow up came down to at risk of obesity category for male and overall population where as the mean BMI for female came down highly close to lower level of obese I BMI category. It is because the initial BMI of male population was comparatively lower than their female counterparts.

After going through the IOTF (International Obesity Task Force, 2002) proposed classification of BMI in Table 6, it has been found that 35 and 23.32 percent of the total subjects were under obese I and II category, respectively and 18.33 percent of the subjects were under risk of obesity category where as only 16.6 percent were from normal and 6.66 percent of total subjects were underweight at the starting of naturopathy center enrollment. After one month of naturopathic diet involvement the percentage of underweight increased to 13.33 percent and the proportion of subjects falling in normal, at risk of obesity and obese I category came down to an equal proportion of 23.32 percent and obese II category was containing only 16.67 percent of subjects. This reduction in BMI is responsible for better blood pressure control for essential hypertensive patients and improves their morbidity status. The present findings on BMI of hypertensive subjects are in concurrence with Amrithaveni and Chanalavada (2003) who observed that obesity is one of the major risk factors for the precipitation of heart disease.

WHR: WHR is one of the parameters to define the individuals who are at risk for obesity. Prior to admission at naturopathy center, the WHR of male and female was 1.04 ± 0.07 and 0.94 ± 0.09 , respectively which decreased to 1.01 ± 0.06 and 0.91 ± 0.08 after 15 days to 0.99 ± 0.05 and 0.90 ± 0.07 after 30 days. Cut off points of WHR that may define risk have been suggested 0.95 for men and 0.80 for women (Croft et al., 1995) but later on, Nutrition Foundation of India (1999) suggested these cut off points as 1.0 for and 0.85 for Indian men and women, respectively. With regard to this parameter, 76.59 percent of male and 93.24 percent female were in the category of abdominal obesity. The present findings are in concurrence with Albu and Sunyer (1997) who reported a positive correlation of WHR with hypertension. After naturopathic diet intake for 15 days, the abdominal obesity prevalence decreased to 56.61 and 89.91 percent for male and female subjects, respectively. However, the corresponding abdominal obesity prevalence came further down to half and 83.25 per cent after 30 days.

Thus the present study indicated that WHR reduction for male essential hypertensive subjects was significant at one level ($P \leq 0.05$) after 15 days, 15 to 30 days and one month after naturopathic diet intake. Further, among male-female and grand total population, the reduction in WHR was fast during initial phase i.e. 2.95, 3.52 and 3.24 percent,

respectively, but slowed down to only 2.68 percent reduction after later half phase of observation. However, in overall population, the reduction in WHR was significant ($P \leq .01$) at all levels. It was also found that after naturopathic diet intervention for 30 days, half of the male and 16.65 percent of female subjects came down with-in the low-risk WHR ratio for various disorders like diabetes, hypertension etc.

The cut-off points for WHR that may define risk for CVD has been suggested .95 for men and .80 for women (Croft *et al.*, 1995). All the subjects were touching the upper level of their cut off points.

CONCLUSIONS

Results of the present study advocate naturopathy center treatment as reliable tool to bring about positive health change along with blood pressure improvement by getting rid of typecast lifestyle of corporate era full of stress. all the subjects experienced effective weight reduction due to change in their food habits and incorporation of healthful foodstuffs in their dietary resume. Since lifestyle modification is an emerging field of interest in dietetics more studies pertaining to vegetarian diet, yoga and meditation are desired. Findings of the study are firmly based upon the intake of the only *satvik* (natural and simple free from any kind of strong chemicals may be natural or synthetic) food in limited quantity along with residing in natural surroundings free from all kinds of pollution so as to serve the dual purpose of complete physical and mental rejuvenation.

Table 3: Physiological Parameters of the Hypertensive Human Subjects at Joining (A), After 15 Days (B) and after 30 Days (C) of Naturopathic Treatment

Parameters	Mean \pm S.D. Values at Different Time Periods			Statistical Interpretation					
	A At Joining	B After 15 Days	C After 30 Days	A v/s B		B v/s C		A v/s C	
				t Value	%=A-B/A x 100	t Value	%=B-C/B x 100	t Value	%=A-C/A x 100
SBP (mmHg) (Systolic Blood Pressure)									
Male (n=30)	157.20 \pm 19.86	130.06 \pm 8.32	124.56 \pm 5.05						
Female (n=30)	166.99 \pm 23.83	124.79 \pm 6.06	125.53 \pm 6.57	6.41**	17.26	3.40**	4.23	8.07**	20.76
Total (N=60)	162.51 \pm 22.27	127.20 \pm 7.58	125.09 \pm 5.84	9.26**	25.27	0.72(NS)	-0.59	9.75**	29.73
				9.42**	21.73	6.24**	3.72	11.53**	23.03
DBP (mmHg) (Diastolic Blood Pressure)									
Male (n=30)	106.29 \pm 15.20	94.50 \pm 15.20	85.06 \pm 5.72						
Female (n=30)	104.81 \pm 11.62	86.05 \pm 6.06	83.58 \pm 4.32	1.62(NS)	11.10	3.51**	9.99	7.38**	19.97
Total (N=60)	105.49 \pm 13.25	89.91 \pm 18.44	84.26 \pm 5.01	3.50**	14.76	3.46**	6.29	7.21**	20.13

NS: Non significant value

*****: Significant value at 5% ($P \geq 0.05$) level of significance as tested by paired t-test.

******: Significant value at 1% ($P \geq 0.01$) level of significance as tested by paired t-test.

A v/s B, B v/s C, A v/s:- Difference within the group with respect to time, on the basis of paired t-test.

%: Percent change derived by using the formula; final value/ initial value X 100

Table 4: Mean (\pm S.D.) Anthropometric Parameters of the Hypertensive Human Subjects at Joining (A), after 15 Days (B) and after 30 Days (C) of Naturopathic Treatment

Parameters	Mean \pm S.D. Values at Different Time Periods			Statistical Interpretation					
	A At Joining	B After 15 Days	C After 30 Days	A v/s B		B v/s C		A v/s C	
				t Value	%=A- B/A x 100	t Value	%=B- C/B x 100	t Value	%=A- C/A x 100
Height (m)									
Male (n=30)	1.68 \pm 0.06	--	--	--	--	--	--	--	--
Female (n=30)	1.54 \pm 0.09	--	--	--	--	--	--	--	--
Total (N=60)	1.60 \pm 0.10	--	--	--	--	--	--	--	--
Weight(kg)									
Male (n=30)	71.30 \pm 12.76	67.99 \pm 11.84	65.03 \pm 11.64	15.48**	6.00	13.94**	2.97	21.63**	8.80
Female (n=30)	67.03 \pm 18.72	62.39 \pm 16.24	59.76 \pm 15.22	7.33**	6.91	9.29**	4.22	8.19**	10.84
Total (N=60)	68.98 \pm 16.09	64.51 \pm 14.32	62.17 \pm 13.71	12.35**	6.48	13.48**	3.63	13.61**	9.88
BMI (Kg/m²)									
Male (n=30)	25.16 \pm 3.95	23.66 \pm 3.72	22.95 \pm 3.60	19.52**	5.97	12.80**	3.01	24.67**	8.80
Female (n=30)	28.07 \pm 5.22	26.16 \pm 5.05	25.07 \pm 4.68	8.17**	6.79	10.07**	4.19	9.16**	10.70
Total (N=60)	26.74 \pm 5.22	25.02 \pm 4.58	24.10 \pm 4.28	12.82**	6.44	12.87**	3.68	13.72**	9.88
WHR									
Male (n=30)	1.04 \pm 0.074	1.01 \pm 0.06	0.10 \pm 0.06	7.60**	2.95	7.08**	1.60	8.60**	4.50
Female (n=30)	0.94 \pm 0.09	0.91 \pm 0.80	0.90 \pm 0.07	13.04**	3.52	6.24**	1.47	10.73**	10.70
Total (N=60)	0.99 \pm 0.09	0.95 \pm 0.09	0.94 \pm 0.08	14.07**	3.24	9.40**	1.54	13.83**	4.73

NS: Non significant value

*: Significant value at 5% ($P \geq 0.05$) level of significance as tested by paired t-test.

** : Significant value at 1% ($P \geq 0.01$) level of significance as tested by paired t-test.

A v/s B, B v/s C, A v/s: Difference within the group with respect to time, on the basis of paired t-test.

%: Percent change derived by using the formula; final value/ initial value X 100

Table 5: Categorization of Male and Female Obese Subjects Studied as Per BMI (wt. / h²) before, during and after Joining Naturopathy Centers

Classification	Category	Female (n=30)			Male (n=30)			Total (N=60)		
		A	B	C	A	B	C	A	B	C
Underweight	<18.5	2 (6.6)	4 (13.2)	4 (13.2)	2 (6.6)	3 (9.99)	4 (13.2)	4 (6.66)	7 (23.31)	8 (13.33)
Normal	18.5-22.9	6 (19.8)	10 (33.33)	12 (39.6)	4 (13.2)	3 (9.99)	2 (6.66)	10 (16.66)	13 (43.29)	14 (23.32)
At risk of obesity	23-24.9	9 (30)	3 (9.99)	6 (19.8)	2 (6.6)	5 (16.66)	8 (26.4)	11 (18.33)	8 (26.64)	14 (23.32)
Obese 1	25-29.9	9 (30)	10 (33.33)	6(19.8)	12 (39.6)	10 (33.33)	8 (26.4)	21 (35.00)	20 (33.33)	14 (23.32)
Obese 2	\geq 30.0	4 (13.2)	3 (9.99)	2 (6.6)	10 (33.3)	9 (30)	8 (26.4)	14 (23.32)	12 (39.96)	10 (16.66)

Figure in parenthesis indicate percentage

A: Before joining naturopathy center

B: 15 days after joining naturopathy center

C: 30 days after joining naturopathy center

Table 6: Categorization of Male and Female Obese Subjects Studied as Per WHR before, during and after Joining Naturopathy Centers

Male (n=30)				Female (n=30)			
Category	A	B	C	Category	A	B	C
.1<	23(76.59)	17(56.61)	15(50)	.85<	28(93.24)	27(89.91)	25(83.25)
.1>	7(23.31)	15(43.29)	15(50)	.85>	2(6.66)	3(9.99)	5(16.65)

Figure in parenthesis indicate the percentage

A: Before joining naturopathy center

B: 15 days after joining naturopathy center

C: 30 days after joining naturopathy center

REFERENCES

1. Davidson, Stanley (1980): *A popular guide to nature cure*. D.P. Taraporewala Sons & Co. Ltd. Bombay: 10-16.
2. Edla Reddy Srinivas, Kumar M.V Ajay, Srinivas Bairy, et al.(2016). *Integrated naturopathy and yoga reduces blood pressure and the need for medications among a cohort of hypertensive patients in South India:3 month follow up study*. *advances in integrative medicine*.3(90-97).
3. Gopalan, c. Ramashastry; B.V. and Balasubramaniam, S.C.(1992): *Nutritive value of Indian foods*. National Institute of Nutrition ICMR, Hyderabad, India.
4. Psaltopoulou Theodora, Hatzis George, Papageorgiou Nikolaos, Androulakis Emmanuel, Briasoulis Alexandros, Tousoulis Dimitris.(2017). *Socioeconomic status and risk factors for cardiovascular diseases: impact of dietary mediators*. *Hellenic society of cardiology*,58,32-42.
5. Radhika G, Sudha V, Sathya RM, Geneshan A, Mohan V (2006) *Association of legumes fruits and vegetable intake with cardiovascular risk factors in South India*. *Abst XXXVIII Annual Meeting, Nutr Soc Ind, Kolkata*. p 50.
6. R. Khatib, J.D Schwalm, S. Yusuf, et al(2014) *patient and healthcare provider barriers to hypertension awareness, treatment and follow up: a systematic review and meta analysis of qualitative and quantitative studies*. *PLOS.9* e84238
7. ICMR (1999) *Dietary Guidelines for Indians (1918-1998)- A Manual*, Hyderabad : National Institute of Nutrition.
8. Amrithveni M, Chandalavada S (2003) *Effect of supplementation of betacarotene and ascorbic acid on the lipid profile of the cardiovascular patients*. *The Ind J Nutr Dietet*. 40 : 238-244.
9. Rao, T. Indira, And Hongsandra Ramarao Nagendra. "The Role Of Yogasanas And Pranayama Techniques In Correcting The Functional Disorders Of Voice Production."
10. International Obesity Task Force (IOTF, 2002) Cited in Weisell RC, *Body Mass Index as an index of obesity*. *Asia Pacific J Clin Nutr* 11(suppl) : 681S-684S.
11. James WPT, Anna Ferro-Lyzzzi, Waterlow JC (1988) *Definition of chronic energy deficiency in adults- report of working party of intervention dietary energy consultation group*. *Am J Clin Nutr*. 42 : 969-981.

12. Jelliffe DB (1966) *The assessment of the nutritional status of the community*. World Health Organisation (Monograph Series No. 53).
13. WHO (2004) Luepker RV, Evans A, Mc Keigue P, Reddy KS (2004) *Cardiovascular Survey Methods (3rd ed)* Geneva. p 147.
14. Croft JB, Keenan NL, Spears MA (1995) *Waist to hip ratio in biracial population measurement implications and cautions for using guidelines to define high risk for cardiovascular disease*. *Food Nutr Bull*. 15: 2.
15. Nutrition Foundation of India (NFI, 1999). *Obesity in the urban middle class in Delhi (Ed) Krishnaswamy Kamala. Scientific Report 15 MBI as an indicator for obesity*. Robert C. Weisell. p 2-4.
16. Albu J, Pi Sunyer FX (1997) *Obesity and Diabetes In : Bray G, Bouchard C, James (Eds). Hand Book of Obesity*. Marcel Decker, New York. pp 34-51.
17. Appel LJ et al. (1997) *A clinical trial on the effects of dietary patterns on blood pressure*. *The New Eng J Med*. 336 (16) : 1117-1123.
18. <http://www.mayoclinic.com/health/fiber/NU00033> 2/11/2008 *Dietary fiber: An essential part of a healthy diet* (2008)
19. <http://www.nhlbi.nih.gov//guidelineshypertension/express.pdf>. 15/11/2003 *JNC VII Express (2003) Prevention, detection, evaluation and treatment of high blood pressure*

