
Impact of six months of naturopathy on symptom score and anthropometric parameters in patients suffering from hypothyroidism

Ranjna Chawla*, Rukamani Nair, Somnath Mukherjee***, Yendrenbam Ibotombi Meitei****, V R Sood*****, B.K Roy *******

**Department of Biochemistry, GB Pant Institute of Post Graduate Medical Education and Research (GIPMER),*

*** ,***&**** Department of Research, Babu Nature Cure Hospital and Yogashram, New Delhi, ***** Ram Lal Kundan Lal Hospital, Delhi, ***** Roy Clinic.*

ABSTRACT

Aim: To study the effect of Naturopathy modalities for six months on signs, symptom and anthropometric parameters in patients suffering from hypothyroidism

Material & Methods: 100 hypothyroidism patients were recruited and 81 completed the trial [41 in control (6 Male 35 Female) and 40 in naturopathy group (4 Male 36 Female)]. The 60 minutes sessions of Naturopathy was given for 56 sittings in a period of six months. Thyroxine medication was given to both the groups as per individual need. Effect of Naturopathy modalities was studied on ten symptoms i.e. fatigue, loss of sleep, cold intolerance, dry skin, loss of appetite, constipation, bradycardia, hyporeflexia, myxedema and menstrual disturbances. Anthropometric parameters included measuring weight, waist circumference, waist hip ratio, fat%, and BMI.

Results: In Naturopathy group a significant reduction in weight ($P=0.011$ after 3 months and $p=0.003$ after 6 months) and BP (SYS) ($P=0.009$ after 6 months) was observed only. Severity of 8 out of 10 symptoms was found to be decreased by Naturopathy treatment. In naturopathy group Fat % which was more at the beginning of the study ($p=0.04$), as compared to control group, decreased after 6 months of naturopathy. Hypothyroid patients in both control and Naturopathy showed a significant reduction in levels of TSH ($P= 0.000$ after 3 and 6 months) and a significant increase in fT4 ($P=0.016$ after 3 months and $p= 0.003$ after 6 months in control and $p=0.005$ after 6 months in Naturopathy group). In Naturopathy group the TSH levels reached euthyroid range but in control group it was still in overt hypothyroid range.

Conclusion: The results suggest that Naturopathy can be a successful complementary treatment for management of weight, blood pressure and in controlling symptoms associated with hypothyroidism.

KEYWORDS: Anthropometric parameters, Hypothyroidism, Naturopathy, Symptom score, TSH.

INTRODUCTION

Primary hypothyroidism may result from diseases or treatments that destroy thyroid tissue or interfere with thyroid hormone biosynthesis. Hypothyroidism is also caused by decreased thyroidal stimulation by TSH, which is referred to as central, secondary, or hypothyrotropic hypothyroidism. Symptoms of hypothyroidism can include fatigue, weight gain, hair thinning, dry skin and depression^{1, 2}. But none of the symptoms is a very specific indicator of the presence of hypothyroidism³. From the clinical perspective hypothyroidism is a syndrome manifested by a collection of signs and symptoms. They are influenced by the age of the patient, the rate at which the hypothyroidism develops, and the presence of other disorders⁴. Hypothyroidism and obesity frequently co-exist. Hypothyroidism leads to increased body weight by increasing fat deposits and by salt and water retention. Extreme obesity also leads to increased levels of TSH⁵.

The current conventional medical treatment for hypothyroidism is giving thyroid hormone supplementation. This is somewhat effective in bringing up thyroid hormone levels. But still there can be fluctuation of symptoms. So there is a great need for additional activities which patients can do to control hypothyroidism, and take control of the overall impact of hypothyroidism. In recent time Complementary and Alternative Medical (CAM) therapies are being increasingly used as adjuncts to modern medicine. In this study we used Naturopathy modalities including massage, steam bath, neck and abdomen packs. According to naturopathy accumulation of morbid matter is the cause of diseases and eliminating those is the cure⁶. In recent times, massage, the oldest of all treatments, is used in many physical rehabilitation programs for relieving mental stress and tension. Steam bath treatment has also been found to reduce pain and preserve muscle strength. The heat soothes nerve endings and relaxes the muscles⁷. This study was undertaken to see if Anthropometric parameters and signs and symptoms in hypothyroidism can be managed by integrating naturopathy with Allopathy treatment. Till date very few studies report such effects of Naturopathy on Hypothyroidism.

MATERIAL AND METHODS

The randomized control trial was carried out at Babu Nature Cure Hospital and Yogashram, Mayur Vihar Phase 1, Delhi. Duration of the study was two years (March 2017-March 2019) and study was conducted after due approval from the Ethical Committee of Babu Nature Cure Hospital and Yogashram. Biochemical investigations were carried out at GIPMER, New Delhi.

Subjects and Study design: 100 Hypothyroid patients in the age group 21-65 years, with TSH level >10 mIU/L and satisfying eligibility criteria of American Association of clinical Endocrinologists (AACE), were enrolled. The registered patients were divided randomly into Groups of 50 each i.e. Group I (control group) and Group II (Naturopathy group). Total of 81 participants completed the trial [41 in control (6 Male 35 Female) and 40 in naturopathy group (4 Male 36 Female)]. Patients were educated about the disease, associated risk factors and benefits of Naturopathy. Informed consent was obtained from patients. Complete clinical history, present and past medications were recorded for each patient at baseline. Patients were provided information sheet and a daily diary to record the compliance to the trial protocol and medicines.

Naturopathy interventions: Participants received 60 minutes of Naturopathy treatment, thrice a week for first 2 months and twice in a week for next 4 months. The frequency of sessions was based on the earlier studies conducted at Bapu Nature Cure Hospital and Yogashram. Naturopathy sessions were scheduled between 6 AM to 5 PM and at least three hours gap was maintained between meal and treatment session. Massage was done with non aromatic sesame oil which has anti inflammatory properties. Details of Naturopathy treatment given are mentioned in Table 1.

TABLE 1: Naturopathy treatments schedule for Group II hypothyroidism patients.

S.No.	Modality	Duration
1	Massage Legs - 8 min, Hip -5 min, Abdomen -7 min, Neck -5 min	25 minutes
2	Steam Bath	10 minutes
3	Neck and Abdomen Pack	25 minutes
4	Total duration	60 minutes

Estimations

Estimations were carried out before starting the intervention, after 3 months and 6 months of intervention

Thyroid profile: In this study thyroid function tests (fT3, fT4, TSH) were performed using CLIA technique on cobas-e411 analyzer.

Signs and Symptoms Score: The Signs and symptoms assessed in the trial were: - a) Symptoms: Fatigue, sleeplessness, cold intolerance, dry skin, decreased appetite, constipation, menstrual disturbances. b) Sign: Bradycardia, myxedema, hyporeflexia. These signs and symptoms were assessed in a scale of 0-3 (0= Normal; 1 = mild; 2 = moderate; 3 = Severe)

Anthropometric measurements:

It included body weight, BMI, waist and hip circumference (inches) and Fat percentage. Fat percentage was determined by the bio-electrical impedance analysis method using Omron HBF-375 Karada Scan Digital Body Composition Monitor. The waist circumference was measured to the nearest 0.1 inch in a horizontal plane midway between the inferior costal margin and the iliac crest. Similarly, hip circumference was measured around the pelvis at the point of maximal protrusion of the buttocks⁸. The ratio of the waist circumference to the hip circumference was derived. BP was also recorded.

Statistical Analysis: The data was analyzed using SPSS16 software. The statistical significance was considered at $p \leq 0.05$ levels for all the parameters and the values are expressed as mean \pm SD.

RESULTS:

Baseline, 3 and 6 months symptom score of participants of Control (group I) and Naturopathy (group II) were recorded (Table 2). At baseline 4.9% of patients in control group and 7.5% patients in Naturopathy group had no fatigue. After 6 months patients without fatigue in control group were 22% and in Naturopathy group were 57.5%. Severity of fatigue was reduced from 39% to 7.3% in control group and 37.5% to 0% in Naturopathy group.

At baseline 34.1% of patients in control group and 45% patients in Naturopathy group had normal sleep pattern. After 6 months patients with normal sleep in control group was 63.4% and in Naturopathy group was 92.5%. Severity of not getting normal sleep was reduced from 9.8% to 2.4% in control group. In Naturopathy group there was no severe case.

At baseline 34.1% of patients in control group and 30% patients in Naturopathy group had normal tolerance to cold. After 6 months patients with normal cold tolerance in control group were 68.3% and in Naturopathy group was 82.5%. Severity of cold intolerance was reduced from 4.9% to 0% in control group and 2.5% to 0% in Naturopathy group.

At baseline 26.8% of patients in control group and 22.5% patients in Naturopathy group had normal skin. After 6 months patients with normal skin in control group were 41.5% and in Naturopathy group were 60%. Severity of dry skin was reduced from 4.9% to 2.4% in control group and 5% to 0% in Naturopathy group.

At baseline 51.2% of patients in control group and 57.5% patients in Naturopathy group had normal appetite. After 6 months patients with normal appetite increased to 68.3% in control group and 92.5% in Naturopathy group. There was no Severity of loss of appetite in control group and Naturopathy group.

At baseline 48.8% of patients in control group and 50% patients in Naturopathy group had no constipation. After 6 months patients without constipation were 63.4% in control group and 87.5% in Naturopathy group. Severity of constipation was reduced to 0% in both control and Naturopathy group.

At baseline 37.1% of women in control group and 50% women in Naturopathy group had no menstrual disturbance. After 6 months patients without menstrual disturbances were 40% in control group and 55.5% in Naturopathy group. Severity of menstrual disturbance was reduced from 11.4% to 2.85% in control group and 2.7% to 0% in Naturopathy group.

At baseline 75.6% of patients in control group and 72.5% patients in Naturopathy group had no Myxedema. After 6 months patients without Myxedema were same as before i.e. 75.6% in control group and 90% in Naturopathy group. At baseline and after six months Bradycardia and Hyporeflexia were found to be normal in all the patients in both the groups.

Table 2 : Comparison of symptom scores (%) in group I and group II

Symptom	Time	Control Group (group I)				Naturopathy Group (group II)			
		Normal	Mild	Moderate	Severe	Normal	Mild	Moderate	Severe
Fatigue	Baseline	4.9	29.3	26.8	39	7.5	25	30	37.5
	3 month	9.8	41.5	31.7	17.1	25	52.5	15	7.5
	6 month	22	41.5	29.3	7.3	57.5	42.5	0	0
Sleepiness	Baseline	34.1	24.4	31.7	9.8	45	22.5	32.5	0
	3 month	43.9	34.1	19.5	2.4	72.5	22.5	5	0
	6 month	63.4	24.4	9.8	2.4	92.5	7.5	0	0
Cold intolerance	Baseline	34.1	36.6	24.4	4.9	30	57.5	10	2.5
	3 month	53.7	26.8	17.1	2.4	75	20	2.5	2.5
	6 month	68.3	22	9.7	0	82.5	15	2.5	0
Dry Skin	Baseline	26.8	36.6	31.7	4.9	22.5	35	37.5	5
	3 month	31.7	36.6	26.8	4.9	50	32.5	15	2.5
	6 month	41.5	36.6	19.5	2.4	60	40	0	0
Loss of Appetite	Baseline	51.2	36.6	12.2	0	57.5	20	20	2.5
	3 month	63.4	29.3	7.3	0	87.5	10	2.5	0
	6 month	68.3	6.8	4.9	0	92.5	7.5	0	0
Constipation	Baseline	48.8	29.3	22	0	50	27.5	20	2.5
	3 month	61	31.7	7.3	0	82.5	15	2.5	0
	6 month	63.4	34.1	2.4	0	87.5	12.5	0	0
Menstrual Disturbance	Baseline	37.1	17.1	11.4	11.4	50	5.2	1.1	2.7
	3 month	31.4	25.7	17.1	2.85	55.5	11.1	0	0
	6 month	40	20	14.3	2.85	55.5	11.1	0	0
Bradycardia	Baseline	100	0	0	0	100	0	0	0
	3 month	100	0	0	0	100	0	0	0
	6 month	100	0	0	0	100	0	0	0
Myxedema	Baseline	75.6	17.1	7.3	0	72.5	25.	2.5	0
	3 month	80.5	17.7	2.4	0	82.5	17.5	0	0
	6 month	75.6	24.4	0	0	90	10	0	0
Hypoflexia	Baseline	100	0	0	0	100	0	0	0
	3 month	100	0	0	0	100	0	0	0
	6 month	100	0	0	0	100	0	0	0

Baseline anthropometric parameters recorded (Table 3) during the study included weight, BMI, waist, waist hip ratio and body fat percentage. The subjects were found to be matched for anthropometric parameters except fat % which was more in Naturopathy group and was statistically significant ($p=0.04$)

Table 3: Baseline values for Anthropometric variables in Control (group I) and Naturopathy group (group II)

Parameters	Control Mean ± SD	Naturopathy Mean ± SD	P-Value
Weight (Kgm)	65.30+11.16	69.36+10.36	0.094
Systolic (mm of Hg)	120.63+14.88	127.93+19.84	0.065
Diastolic (mm of Hg)	79.48+9.89	82.22+11.03	0.24
BMI (Kg/m ²)	26.64+4.13	28.48+4.65	0.06
Waist – Hip ratio	0.92+0.07	0.90+0.07	0.20
Waist circum. (inch)	37.05+3.41	38.25+4.09	0.155
Fat %	35.09+5.45	37.70+5.97	0.04*

Comparison of changes in anthropometric variables after 3 and 6 months in control, Naturopathy group is presented in Table 4. In control group there was no change in any of the parameters. In Naturopathy group a significant reduction in weight (p=0.001) and BP (Sys) (p= 0.002) was recorded.

Table 4: Anthropometric variables in Control (group I) and Naturopathy group (group II) after different intervals of time.

* p≤0.05, ** p≤0.01, *** p≤0.001

Parameter	Groups	Baseline	3rd Month	6th Month	RM ANOVA	
		Mean±SD	Mean±SD	Mean±SD	F-stat	P-Value
Weight (Kg)	Control	65.30±11.16	64.91±11.04	64.95±10.96	1.484	0.23
	Naturopathy	69.36±10.36	68.66±10.85	68.11±11.11	9.41	0.001***
BP (SYS) (Mm of Hg)	Control	120.63±14.88	119.12±13.52	119.95±12.78	0.305	0.72
	Naturopathy	127.93±19.84	122.95±15.66	119.95±8.80	7.36	0.002**
BP(DIA) (Mm of Hg)	Control	79.48±9.89	78.80±8.15	78.29±7.75	0.458	0.60
	Naturopathy	82.22±11.03	81.80±8.65	79.45±6.45	2.46	0.10
BMI (Kg/m ²)	Control	26.64±4.13	26.58±3.94	26.60±3.87	.117	0.82
	Naturopathy	28.48±4.65	34.54±37.04	27.39±6.32	1.44	0.23
W/H	Control	0.92±0.07	0.93±0.08	0.92±0.07	1.31	0.27
	Naturopathy	0.90±0.08	0.91±0.06	0.90±0.06	0.60	0.49
Waist (inch)	Control	37.05±3.41	36.67±3.04	36.57±3.46	2.51	0.09
	Naturopathy	38.25±4.09	38.11±4.12	37.63±4.24	2.70	0.07
Fat (%)	Control	35.09±5.45	34.95±5.88	35.47±5.80	0.490	0.54
	Naturopathy	37.70±5.97	36.61±7.87	36.21±6.42	2.72	0.12

In Naturopathy group, pair wise mean effect between the test intervals, using Bonferroni comparison, (Table 5) showed that the decrease in weight was observed from 0 to 3rd month

($p=0.011$) and 0 to 6th month ($p= 0.003$). For decrease in BP (Sys) the decrease was observed after 6 months $p=0.009$.

Table 5: For Anthropometric variables pair wise mean effect between the test intervals using Bonferroni comparison in Naturopathy Group

Parameter	Time Interval		Mean Difference	SE	P-Value	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
Weight	Baseline	3 rd Month	0.703	0.226	0.011*	0.136	1.269
		6 th Month	1.240	0.354	.003**	0.356	2.124
	3 rd Month	6 th Month	0.538	0.265	0.148	-0.125	1.200
BP	Baseline	3 rd Month	4.975	2.013	0.054	-0.061	10.011
		6 th Month	7.975	2.512	0.009**	1.690	14.260
	3 rd Month	6 th Month	3.00	1.693	0.253	-1.236	7.236

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Baseline characteristics of Thyroid function tests were recorded (Table 6) and the subjects were found to be matched for Thyroid function tests and there was no statistical significant difference at the beginning of the study.

Table 6: Baseline Thyroid Function Test of Control (group I) and Naturopathy group (group II)

Parameters	Group I (Mean±SD)	Group II (Mean±SD)	P-Value
fT3 (pg/ml)	2.9±0.44	2.68±0.58	0.07
fT4 (ng/dl)	1.04±0.23	1.06±0.24	0.70
Serum TSH (uIU/ml)	14.53±9.58	17.16±9.28	0.21

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Thyroid function tests (fT3, fT4 and TSH) were estimated at baseline, after 3 months and after 6 months (Table 7). Post intervention there was significant improvement in fT4 levels in both groups ($P=0.001$, $P=0.003$ in control and Naturopathy groups respectively). At baseline the mean serum TSH concentrations of both groups were in the overt hypothyroid range. After intervention serum TSH concentration showed significant reduction ($p= 0.000$) in both the groups. Levels of TSH only in group given Naturopathy treatment was found to be in euthyroid range.

Table 7: Comparison of changes in Thyroid function test in Control Group (I) and Naturopathy group (Group II)

Parameters	Groups	Baseline	3 rd Month	6 th Month	RM ANOVA	
		Mean ± SD	Mean ±SD	Mean±SD	F-stat	P-Value
fT3 (pg/ml)	I	2.90±0.44	3.01±0.79	2.97±0.42	0.42	0.61
	II	2.68±0.58	2.82±0.50	2.84±0.42	1.81	1.72
fT4 (ng/dl)	I	1.04±0.23	1.18±0.24	1.19±0.25	7.48	0.001**
	II	1.06±0.24	1.16±0.22	1.24±0.24	7.40	0.003**
TSH (uIU/ml)	I	14.53±9.58	7.33±8.35	7.74±8.08	26.38	0.000***
	II	17.16±9.28	4.98±2.97	3.93±2.75	62.29	0.000***

* p≤0.05, ** p≤0.01, *** p≤0.001

In the Control group, pair wise mean effect between the test intervals, using Bonferroni comparison, (Table 8) showed that level of significance for the decrease in fT4 from 0 to 3rd month was p=0.016 and from 0 to 6th month was p=0.003. For TSH the level of significance, for the decrease observed, was p=0.000 for baseline to 3rd month and from baseline to 6th month.

Table 8: Pair wise mean effect between the test intervals using Bonferroni comparison in Control Group I

	Time Interval		Mean Difference	SE	P-Value	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
fT4	Baseline	3 rd Month	-0.140	0.047	0.016*	-0.258	-0.021
		6 th Month	-0.154	0.043	0.003***	-0.261	-0.47
	3 rd Month	6 th Month	-0.014	0.041	1.00	-0.118	0.089
TSH	Baseline	3 rd Month	7.204	1.150	0.000**	4.332	10.077
		6 th Month	6.802	1.223	0.000***	3.746	9.859
	3 rd Month	6 th Month	-0.402	0.954	1.00	-0.279	1.981

* p≤0.05, ** p≤0.01, *** p≤0.001

In Naturopathy group, pair wise mean effect between the test intervals, using Bonferroni comparison, (Table 9) showed that the decrease in TSH was observed at 3rd and 6th month (p= 0.000) . For fT4 increase was observed after 6th months (p= 0.005).

Table 9: Pair wise mean effect between the test intervals using Bonferroni comparison in Naturopathy Group

	Time Interval		Mean Difference	SE	P-Value	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
T4 ng/dl	Baseline	3 rd Month	-.096	0.049	0.173	-0.220	0.027
		6 th Month	-0.172	0.050	0.005**	-0.298	-0.046
	3 rd Month	6 th Month	-0.075	0.032	0.073	-0.156	0.005
TSH	Baseline	3 rd Month	12.181	1.517	0.000***	8.386	15.976
		6 th Month	13.232	1.619	0.000***	9.183	17.281
	3 rd Month	6 th Month	1.051	0.537	0.173	-0.294	2.395

* p≤0.05, ** p≤0.01, *** p≤0.001

DISCUSSION

The results of this study showed that after Naturopathy treatment there was significant improvement in FT4 levels and significant reduction in TSH levels in both the groups. Serum TSH levels in the Naturopathy group reached the normal physiological range but in the control group normal TSH levels were not achieved. As per the AACE recommendations, the effective treatment of Hypothyroidism is restoring the elevated serum TSH to the normal physiological range⁹. This shows that Naturopathy intervention along with Thyroxine replacement was more effective in controlling hypothyroidism. One of the treatments used in Naturopathy module was massage, a touch technique which relieves muscular pain and facilitates healing and relaxation. It increases general circulation in endocrine system and thus helps in transport of hormones. Proper massage and acupressure rejuvenate sluggish thyroid and adrenal glands. In some studies, sauna-induced thermal stimuli of various intensity was found to decrease TSH levels in normal women^{10,11}. There are reports regarding increase in serum cortisol levels after steam bath treatment which result in decreased levels of TSH¹². This may be reason for significant lowering of TSH by naturopathy treatment. The combined effect of Naturopathy treatments used in our study could have resulted in lowering of TSH levels over a period of 3 and 6 months.

Weight gain is strongly associated with hypothyroidism. In this study hypothyroid patients taking Naturopathy have shown significant reduction in mean body weight and systolic blood pressure. In naturopathy group Fat % which was more at the beginning of the study (p=0.04), as compared to control group, decreased after 6 months of naturopathy. A study published by Nyrnes et al¹³ reported that increase in BMI throughout study period was positively correlated with increases in TSH. Also insulin resistance associated with obesity leads to changes in the thyroid that can result in changes in TSH levels¹⁴. Therefore, maintaining appropriate anthropometric variables is very important for thyroid patients. Heat generated by the steam may stimulate the body and increase wellness. It can also help burn calories. Being in the heat of a steam can make the body release endorphins, which are known as feel good hormones because they help in reducing the stress in the body. Use of complementary and

alternative medicine including thermotherapy, acupuncture, massage etc might reduce pain and inflammation through release of endogenous β -endorphin, and serotonin¹⁵. Massage and Steam therapy has been shown to reduce blood pressure. Both improve general circulation, as blood passes more rapidly through tissue being massaged or exposed to high temperature. Massage and steam bath can dilate blood vessels, which can decrease blood pressure. Steam bath helps in reducing weight which is required in treatment of hypothyroidism. Literature review shows that there is growing clinical evidence of the use of Naturopathy therapies in chronic non-communicable degenerative disorders¹⁶. Kim J reported significant reduction in waist circumference and abdominal subcutaneous fat in postmenopausal women after 6 weeks of aromatherapy massage¹⁷. In one study it was observed that lifestyle change by integration of specific non-drug Yoga and Naturopathic intervention for 6 weeks was useful in the management of metabolic syndrome¹⁸.

In Naturopathy group improvement in symptoms like fatigue, dryness of skin, constipation, myxedema, improved appetite was observed. This may be the result of beneficial effects of massage and steam bath. Massage has a normalizing effect on the sympathetic and parasympathetic Automatic Nervous System (ANS), which functions without conscious effort, thereby reducing the false stress reflex. Massage might reduce pain, swelling, stress and anxiety; promote muscle relaxation and mobility along with improvement in quality of Sleep¹⁹. Sauna might produce positive effect on locomotor system, psycho-emotional status, and pain²⁰. This may be the reason for improved sleep pattern observed in patients in Naturopathy group. We observed that 45% patients in normal range increased to 92.5% after 6 months of treatment. Massage stimulates peristalsis, which can aid in relief of constipation and/or diarrhoea. We observed in our study that for constipation 50 % patients in normal range increased to 87.5% after 6 months of treatment. Also in our study we observed normal appetite in more number of patients. It was seen that normal appetite in 57.5 % patients in normal range increased to 92.5% after 6 months of treatment. Steam bath is helpful in case of dry skin, because of its circulatory and thermal effect²¹. Also warm condensation will help rinse away dirt and dead skin and help to repair broken skin tissue. Moist heat, such as that provided by a steam bath, can improve circulation by dilating the small blood vessels or capillaries²². For improving skin symptoms massage may aid in vitality and elasticity of skin and aid in elimination of dead cells. In our study we observed that 22.5 % patients for normal skin increased to 60% after 6 months of treatment. Lactic acid forms in muscles as a result of muscular activity and too much can result in muscular fatigue and/or cramps. In our study we observed that 7.5% patients in normal range increased to 57.5% after 6 months of treatment. Acupuncture¹⁵ and massage¹⁹ therapies are commonly employed for most of the pain management. Massage and steam bath may reduce fatigue by decreasing lactic acid thus causing muscles fatigued by accumulated lactic acid to be restored sooner. Myxedema may also be less because of reduced inflammation. In our study we observed that 72.5% patients in normal range increased to 90% after 6 months of treatment.

Proper absorption of orally administered Thyroxine in the intestine is a critical step. It is also possible that massage may improve tone of large and small intestines and has a stimulating effect on the digestive organs, which helps improve digestion. Massage accelerates the passage into the gut and also accelerates the rate of absorption²³. Better absorption of ingested Thyroxine in the intestine could have resulted in enhanced control of serum TSH levels in the intervention groups.

Unlike Allopathy, Naturopathy addresses to the root cause of the problem. Long-term intake of artificial hormones by the body results in reduced function of thyroid gland and eventually increased reliance on artificial hormones. Naturopathy, in combination with medication, seems to have great potential so as to handle the disease in a better way. Results of our study demonstrate many therapeutic effects of Naturopathy not studied earlier.

CONCLUSION

Considering the effects achieved in this study Naturopathy can be used as a safe and beneficial intervention in managing weight, blood pressure and in controlling most of the symptoms of hypothyroidism.

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REFERENCES

- i. Oddie TH, Boyd CM, fisher DA, Hales IB. Incidence of signs and symptoms in thyroid disease. *Med J Aust* 1972;2(18):981-6.
- ii. Zulewski H, Muller B, Exer P, Miserez AR, Staub JJ. Estimation of tissue hypothyroidism by a new clinical score: evaluation of patients with various grades of hypothyroidism and controls. *J Clin Endocrinol Metab* 1997; 82(3):771-6.
- iii. Bemben DA, Hamm RM, Morgan L, Winn P, Davis A, Barton E. Thyroid disease in the elderly. Part 2. Predictability of subclinical hypothyroidism. *J Fam Pract* 1994;38(6):583-8.
- iv. Griffin JE. Hypothyroidism in the elderly. *Am J Med Sci* 1990;299(5):334-45.
- v. Verma A , Jayaraman M, Kumar HKVS, Modi KD. Hypothyroidism and obesity: Cause or effect. *Saudi Med J* 2008;29(8):1135-38.
- vi. Rastogi R. Current approaches of research in naturopathy: How far is its evidence base? *J Homeopath Ayurvedic Med.* 2012;1:1000107.
- vii. Petrofsky J, Berk L, Bains G, Khowailed I, Hui T, Granado M et al. Moist heat or dry heat for delayed onset muscle soreness. *J Clin Med Res* 2013; 5(6): 416–25.
- viii. World Health Organization. Geneva:WHO;2011. Waist circumference and waist–hip ratio-Report of a WHO expert consultation.
- ix. Jeffrey G, Rhoda C, Hossein G, James H, Irwin K, Jeffrey M et al. Clinical Practice Guidelines for Hypothyroidism in Adults: Cosponsored by the American Association of Clinical Endocrinologists and the American Thyroid Association. *Endocrine Practice* 2012; 18(6): 988-1028.
- x. O'Malley BP, Davies TJ, Rosenthal FD. TSH responses to temperature in primary hypothyroidism. *Clin Endocrinol* 1980;13(1): 87- 94.

-
- xi. Pilch W, Szyguta Z, Torii M. Effect of the sauna-induced thermal stimuli of various intensity on the thermal and hormonal metabolism in women. *Biology of Sport* 2007;24(4):357–73.
- xii. Samuels MH. Effects of variations in physiological cortisol levels on thyrotropin secretion in subjects with adrenal insufficiency: a clinical research center study. *J Clin Endocrinol Metab* 2000; 85(4):1388–93.
- xiii. Nyenes A, Jorde R, Sundsfjord J. Serum TSH is positively associated with BMI. *Int J Obes* 2006; 30(1), 100–105.
- xiv. Rezzonico J, Rezzonico M, Pusiol E, Pitoia F, Niepomniszcze H. Introducing the thyroid gland as another victim of the insulin resistance syndrome. *Thyroid* 2008; 18(4):461-4.
- xv. Amezaga Urruela M, Suarez-Almazor ME. Acupuncture in the treatment of rheumatic diseases. *Curr Rheumatol Rep.* 2012;14:589–97.
- xvi. Shetty GB, Mooventhan A, Anagha N. **Effect of electro-acupuncture, massage, mud, and sauna therapies in patient with rheumatoid arthritis.** *J Ayurveda Integr Med* 2015; 6:295-99.
- xvii. Kim HJ. Effect of Aromatherapy Massage on Abdominal Fat and Body Image in Postmenopausal Women. *Taehan Kanho Hakhoe chi.* 2007, 37(4):603-12.
- xviii. Swathi Gowda, Sriloy Mohanty, Apar Saoji, Raghuram Nagarathna. Integrated Yoga and Naturopathy module in management of Metabolic Syndrome: A case report. *J Ayurveda Integr Med.* 2017,8(1): 45–48.
- xix. Mooventhan A, Nivethitha L. Effects of acupuncture and massage on pain, quality of sleep and health related quality of life in patient with systemic lupus erythematosus. *J Ayurveda Integr Med.* 2014;5:186–9.
- xx. Matveikov GP, Marushchak VV. An evaluation of the effect of the sauna on the clinical, laboratory and psychological indices in rheumatoid arthritis. *Ter Arkh.* 1993;65:48–51.
- xxi. H. K. Bakhru. New Delhi: Jaico Publishing house;2010. The complete handbook of NATURE CURE(Fifth edition).
- xxii. Everett B. Lohman III, Kanikkai Steni Balan Sackiriyas, Gurinder S. Bains, Giovanni Calandra, Crystal Lobo, Daniel Nakhro et al. A comparison of whole body vibration and moist heat on lower extremity skin temperature and skin blood flow in healthy older individuals *Med Sci Monit.* 2012; 18(7): 415–24.
- xxiii. Cori CF, Edward L, Villiaume, Cori GT. Studies on intestinal absorption: The absorption of ethyl alcohol. *J Biol Chem* 1930;87: 19-26.