

Efficiency of Yogic Practices on Thyroid Profile in Hypothyroid Females - A Randomised Control Trial

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Abstract

Background: Hypothyroidism is a pervasive health issue worldwide and in India, being more rampant in women, results primarily due to insufficient secretion of thyroid hormone from thyroid gland manifesting in form of multiple sign and symptomatology mostly with biochemically evident deranged serum thyroid profile. Hypothyroidism has also been implicated in as an antecedent predicament towards development of disorders like obesity, sleep apnea, coronary artery disease, depression etc. There have been reports stating benefits of Yogic practices in individuals with hypothyroidism, obesity, depression, however the results have been mixed and were far from being conclusive.

Aim: The present study is aimed towards exploration of probable therapeutic effect of practising select Yogic exercises in women suffering from hypothyroidism.

Methodology: The present study was conducted on 80 hypothyroid female patients who were randomly segregated in two groups resulting in formation of 2 cohorts namely, study and control group. The participants under the study group were asked to perform select Yogic exercises for a period of 3 months, 5 days in a week under supervision. All the participants were assessed for weight, BMI, serum thyroid stimulating hormone (TSH) level, serum triiodothyronine levels (T3) and serum thyroxin levels (T4) before and after Yogic intervention.

Results: Following 3 months of yoga practice, the participants enrolled under study cohort demonstrated highly significant reduction ($p < .001$) in weight and BMI and significant improvements in the serum thyroid profile.

Conclusion: Present study proffers that regular practice of yoga has a propensity towards improvement of thyroid profile in persons suffering from hypothyroidism and hence these Yogic exercises should be used in adjunct to standard pharmacologic treatment for management.

Keywords: Hypothyroidism, Yoga, T3, T4, TSH, BMI

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Introduction

Hypothyroidism is a common endocrine disorder resulting from deficiency of thyroid hormone or, more rarely, from

their impaired activity at tissue level. It is believed to be a standard health issue in India and worldwide. The prevalence of

hypothyroidism is quite high, affecting approximately one in 10 out of 35 adults. It's more prevalent in females and elder population. [1-5]

The prevalence of hypothyroidism in developed countries is about 4% - 5%, when compared to the western countries (UK, 2%; USA, 4.6%), a higher prevalence of hypothyroidism is reported in India is around 10.95%. One in ten adults is claimed to possess hypothyroidism in India [6]. Thyroid disorders are the most common among all the endocrine diseases in India. [7]

Hypothyroidism presents an outsized epidemiological burden in India. Imbalance in production of thyroid stimulating hormone (TSH), or hypothalamus, which regulates the pituitary via thyrotropin releasing hormone (TRH). Thyroid disorders can range from a little, harmless goiter (enlarged gland) that needs no treatment to life threatening cancer. The most common thyroid problems involve abnormal production leads to hypothyroidism [8].

As estimated one in eight women will develop a thyroid disorder at some point in her life, according to the American Thyroid Association, so it's essential to have a basic understanding of what this gland does and recognize symptoms that could point to its dysfunction. The thyroid hormones increase the basal metabolic rate and have effects on almost all body tissues. Appetite, the absorption of drugs, and gut motility are all influenced by thyroid hormones [9]

The National Institutes of Health National Center for Complementary and Alternative Medicine (NIH NCCAM) defines complementary medicine as being used alongside standard medical treatments, and alternative medicine as being used in place of standard medical treatments. Integrative medicine may be a comprehensive approach to care that includes a patient's

mind body and spirit; this combines standard medicine with CAM practices.

Yoga is popular complementary and alternative medicine (CAM) therapy being increasingly used for the prevention and management of non-communicable diseases across the world.

A typical yoga practice includes physical postures (asanas), voluntarily regulated breathing techniques (pranayamas), meditation, and certain philosophical principles. [10]

Regardless of its spiritual origins, yoga has become a well-liked route to physical and mental well-being [11,12]. Yoga improves blood circulation in throat area which stimulates thyroid gland [13]. Yoga practice influences the hypothalamo-pituitary-thyroid axis and leads to decrease in serum TSH [14].

Yoga helps improve physical symptoms of hypothyroidism, such as increases alertness, decreases sudden weight gain, decreases sensitivity to cold, tremor in hands. It also promote better sleep as yoga relieves joint pain and muscle tension [15].

Previous studies on yoga reported that yoga helps in reducing the body mass index (BMI) and body weight [16,17], a progressive decrease in serum TSH, but no change in triiodothyronine (T3) or thyroxin (T4) levels [17,18,19]. Hence, in the present study, we aimed to assess the effect of yoga-based lifestyle in the management of hypothyroidism and its associated complications

Material and Methods

The present study was an open label randomised controlled trial carried out from June 2019 to November 2020 enrolling a total of 80 female subjects aged 30-40 years being randomly allocated in two study cohorts, namely, study and control group. The subjects were selected amongst the diagnosed cases of hypothyroidism attending the thyroid

clinic running under the department of medicine, SMS medical college and attached hospitals, Jaipur, subject to fulfilment of exclusion and inclusion criteria. Subjects who were not interested in performing yoga practices, subjects with known cardiac disease, hypertension, history of recent surgery, slip disc, low back pain, alcohol or drug addicts and those subjects who practiced yoga or any other similar discipline during 6 months preceding the study were excluded from taking part in the study. The subjects satisfying the preset selection criteria were further divided in two groups by adopting simple randomisation using a lottery based method in which the subjects were asked to pick up a paper chit with one of the two designate group mentioned in it. Detailed history taking and physical examination was performed on all the study participants.

Participants enrolled under the 'Study Group' were first trained for select yogic practices and were subsequently asked to perform them in presence of a trained yoga instructor for 5 days in a week for a duration of 3 months. The program consisted of a practical session on loosening exercise and asana (Postures) for 20 minutes, pranayamas (breathing techniques) for 15 minutes, meditation for 10 minutes and shavasana (a relaxation technique) for 5 minutes.

The ASANAS used were; Bhujangasana (Serpent pose), Shalabhasana (Locust pose), Dhanurasana (Bow pose), Gomukh asana (Cow face pose) and Vrikshasana (Tree pose). PRANAYAMA used were: Bhramari pranayama and Ujjayi pranayama.

The participants in both the groups were asked to continue with their routine thyroxine replacement medications, however yogic exercises were performed by only the 'Study Group'. All the participants across the group were assessed for anthropometric parameters (like weight

& BMI) and thyroid profile (serum fTSH, fT3, fT4 level) at the outset as well at the completion of three month exercise programme.

Data was tabulated and was further analysed using Statistical Package for Social Sciences (SPSS) version 10. Unpaired Student's t test was used to find out the significance of difference in mean of variables across the groups (study and control group). Paired Student's t test was used to find out the significance of difference in mean of variables compared before and after the intervention within the same group. A p-value of <0.001 was considered statistically highly significant, p-value of <0.05 was considered significant and a p-value of >0.05 was considered statistically not significant.

Results

When the groups were assessed and compared for weight and body mass index (BMI) before and after the completion of intervention, statistically significant difference was observed only in the 'Study Group'.

The level of serum fTSH was comparable between the two groups at the beginning, however at the end of intervention programme there was a statistically significant difference in mean serum fTSH levels between the two groups. In study group TSH levels were decreased by 24.03% (Mean±SD = 6.13±1.44) & in control group TSH levels were decreased 23.67% (Mean±SD=6.32±1.09). The TSH levels were more decreased in study group as compared to control group.

The T3 hormone level difference in study and control group was found statistically insignificant at baseline and after 3 months. The T3 hormone level difference was found statistically significant in study & control group after 3 months. In study group T3 hormone levels were increased by 30.69% (Mean±SD=2.81±0.52) & in control group T3 hormone levels were increased by 23.94% (Mean±SD=

2.64±0.44). The T3 hormone levels were more increased in study group as compared to control group.

The T4 hormone level difference in study and control group was found statistically insignificant at baseline and after 3 months. At 3 months of follow up in study group there was highly significant (p<.001) increase in thyroxine (T4) hormone levels

were observed. Significant (p<.05) increase in T4 hormone levels observed in control group. In study group T4 hormone levels were increased by 17.04% (Mean±SD =1.03±0.25) & in control group T4 hormone levels were increased by 13.33% (Mean±SD=1.02±0.027). The T4 hormone levels were more increased in study group as compared to control group.

Table 1: Thyroid profile in study group (Mean±SD)

Parameters	Before intervention	After intervention	p value
T3	2.15±0.57	2.81±0.52	<0.001
T4	0.88±0.27	1.03±0.25	<0.001
TSH	8.07±1.86	6.13±1.44	<0.001

Table 2: Thyroid profile in control group (Mean±SD)

Parameters	Before intervention	After intervention	p value
T3	2.13±0.48	2.64±0.44	<0.034
T4	0.90± 0.27	1.02± 0.21	<0.027
TSH	8.28±1.76	6.32±1.09	<0.036

Table 3: Weight, BMI in study group (Mean±SD)

Parameters	Before intervention	After intervention	p value
Weight	54.20±6.14	53.03±6.39	<0.001
BMI	22.85±2.05	22.53±2.07	<0.017

Table 4: Weight, BMI in control group (Mean±SD)

Parameters	Before intervention	After intervention	p value
Weight	52.88±4.76	53.05±5.01	<0.404
BMI	22.40±2.15	22.54±2.29	<0.479

Discussion

Following three months of yoga practice in study group there were statistically highly significant changes (p<.001) in weight, thyroid stimulating hormone, T3 hormone levels and T4 hormone levels were observed. Significant change (p<0.05) was seen in body mass index.

In control group there were statistically highly significant changes (p<.001) in thyroid stimulating hormone and T3 hormone levels & significant change (p<.05) in T4 hormone levels were seen.

No significant change observed in body mass index in control group.

Singh S et al (2012) similarly in their study found that there is significant decrease in weight and hence BMI in yoga group while not in control group [16].

Werner, Wallace, Janssen, Stryker & Chamers (1986) [19] studied long-term endocrinologic changes in subjects practicing the meditation and sidhi programme. They reported yogic practices decreases serum TSH levels and had no change in T3 and T4 levels at all.

Dr. E. Vasandha kumar Chandhini R. Prof. V. Mahadevan (2020)[20] studied on fifteen females before and after twelve weeks of yogic practices. They found significant improvement in TSH, T3 and T4 levels similar to our study.

Transcendental meditation gives rise to a unique state of deep rest by marked reductions in resting heart rate, respiratory rate, oxygen consumption, metabolic activity, increased cerebral blood flow may be responsible for the decrease of serum TSH in the human body [21,22].

In the graded yogic training schedule, there were *suryanamaskara* (dynamic physical posture), *shithilikarana* (loosening) practices and *asanas* (physical postures) which were reported as moderate aerobic type of exercises may positively decreased the basal level of TSH and increased T3 and T4 levels in the blood plasma [23,24]. Moreover, specific yogic poses (*Sarvangasana*, *Halasana*, *Ustrasana*, *Matyasana*, *Bhujangasana*) can stimulate the throat area by squeezing and stretching or massaging the thyroid gland placed in the neck region. Regular practice of *pranayama* (*surya vedhana*, *ujjai*, *bhastrika*, *bhramari*, *sitali*, *sitkari*) and meditation may send positive feedback to hypothalamus and pituitary [22]. On the other hand, exercising increases metabolic activity, this helps burn more calories and helps keep weight down. Research results showed that medium-intensity aerobic exercise, produced the best results for improving TSH. Exercise can by itself improve thyroid function may be through better perfusion of gland [25]. K. N. Udupa(1985) noted that the pranayama practices like *bhramari* may bring about such benefit through central action on either the hypothalamus or the limbic cortex. Yoga poses like shoulder stand (*Sarvangasana*), plow pose (*Halasana*), fish pose (*Matsyasana*), camel pose (*Ustrasana*), cobra pose (*Bhujangasana*), bridge formation pose (*Sethubandhasana*), shoulder-stand pose, and bow pose

(*Dhanurasana*) help balance and regulate the functioning of the thyroid gland [10]. *Ujjayi pranayama* also works wonders by re-balancing metabolism and improving reflex pathways within the throat to cure thyroid imbalance [26,27].

Conclusion

The present study was planned to study the effects of *yogasanas* on thyroid profile, weight, BMI in hypothyroid female patients. from present study it is concluded that the regular practice of yoga improves the thyroid profile, improves psychological wellbeing and can improve the quality of life of the patients. Yoga is noncompetitive, personal, inexpensive and enjoyable activity which can produce amazing results. Therefore we conclude that yoga can be used adjunctively with standard pharmacologic treatment for management of hypothyroid patients. In light of these facts, yogic exercises can become most important lifestyle intervention of many diseases as prescribed by World Health Organization.

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