CERTIFICATE

This is to confirm that Mr. Venkatesh T is a Ph.D scholar with the university registration number PhD/Cat3/15/ Jan 2013 in the Division of *Yoga* and Life Sciences, effective January 14, 2013. He has completed all of the required course work and other criteria for thesis submission. The thesis, titled "Effect of an Integrated Approach of *Yoga* Therapy Practices on Hypothyroidism: A Randomized Controlled Study," is based on legitimate work he completed in accordance with university requirements. Furthermore, it is declared that the type of study of this thesis has never before been used to grant a degree, certificate, fellowship, or other comparable title.

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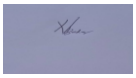

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Date: 16.03.2022
Place: Bengaluru

DECLARATION

I thus declare that under the supervision of Dr. Ravi Kumar Itagi, I finished the thesis "Effect of an Integrated Approach of *Yoga* Therapy Practices on Hypothyroidism: A Randomized Controlled Study" at the Swamy Vivekananda *Yoga* Anusandhana Samsthana (S-VYASA; Deemed to be a University), Bengaluru

I also declare that the type of study of this thesis has never before been used to grant a degree, certificate, fellowship, or other comparable title.

Date: 16.03.2022 (VENKATESH T)

Place: Bengaluru (Candidate)

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STANDARD INTERNATIONAL TRANSLITERATION CODE USED TO TRANSLITERATE *SAṀSKṚTA* WORDS

a	=	अ	**ṅa**	=	ङ	**Pa**	=	प
Ā	=	आ	**ca**	=	च	**pha**	=	फ
I	=	इ	**cha**	=	छ	**Ba**	=	ब
Ī	=	ई	**ja**	=	ज	**bha**	=	भ
U	=	उ	**jha**	=	झ	**Ma**	=	म
Ū	=	ऊ	**ña**	=	ञ	**Ya**	=	य
ṛ	=	ऋ	**ṭa**	=	ट	**ra**	=	र
ṝ	=	ॠ	**ṭha**	=	ठ	**La**	=	ल
e	=	ए	**ḍa**	=	ड	**va**	=	व
ai	=	ऐ	**ḍha**	=	ढ	**Śa**	=	श
o	=	ओ	**ṇa**	=	ण	**ṣa**	=	ष
au	=	औ	**ta**	=	त	**sa**	=	स
aṁ	=	अं	**tha**	=	थ	**ha**	=	ह
aḥ	=	अः	**da**	=	द	**kṣa**	=	क्ष
ka	=	क	**dha**	=	ध	**tra**	=	त्र
kha	=	ख	**na**	=	न	**jña**	=	ज्ञ
ga	=	ग						
gha	=	घ						

ABBREVIATIONS

AACE - American Association of Clinical Endocrinology

AVP - Arginine Vasopressin

BDNF - Brain Derived Neurotropic Hormone

BMI - Body Mass Index

BMR -Basal Metabolic Rate

CAM - Complementary and Alternative Medicine

CRP - C-Reactive Protein

CVR - Content Validity Ratio

DHT - Dihydrotestosterone

DRT - Deep Relaxation Technique

DTC - Differentiated Thyroid Cancer

FT3 - Free Triiodiothyronine

FT4 - Free Thyroxine

GABA - Gamma Amino Butyric Acid

HDLC - High Density Lipoprotein Cholesterol

HPA - Hypo-thalamic-pituitary-adrenal Axis

HSCRP - High Sensitivity C -Reactive Protein

IAYT - Integrated Approach of *Yoga* Therapy

IRT - Instant Relaxation Technique

IDB - Inflammatory Bowel Diseases

IU/Ml - International Units per Millilitre

Kg - Kilogram

Kg/M2 - Kilogram / Square Meter

LDLC - Low Density Lipoprotein Cholesterol

LDN - Low Dose Naltrexone

Mg/L - Milligrams Per Liter

ml U/L - International Units Per Milliliter

Nmol/L - Nanomoles Per Litre

OCP - Oral Controseptive Pills

PCOS - Polycystic Ovary Syndrome

Pmol/L - Picomoles Per Litre

Pmol/L - Picomoles Per Litre

PPARgamma - Proliferator-Activated Receptor Gamma

QOL - Quality of Life

QRT – Quick Relaxation Technique

RT3 - Reverser Triiodothyronines

RT4 - Reverser Thyroxine

SHBG - Sex Hormone Binding Globulin

SME - Subject Matter Experts

SPSS - Statistical Package for Social Sciences

STSH - Sensitive Thyroid Stimulating Hormone

T3 - Triiodiothyronine

T4 - Thyroxine

TBII - Thyrotropin Binding Inhibiting Immunoglobulins

TC - Triglyceride

Tg AB - Thyroglobulin Antibody

TPO - Thyroid Peroxidase Antibody

TRH - Thyrotropin Releasing Hormone

TSH - Thyroid Stimulating Hormone

TSHR - Antithyroid Stimulating Hormones Receptor

Ug/Dl - Micrograms of Lead Per Deciliter of Blood

WHO - World Health Organization

ABSTRACT

BACKGROUND

The thyroid disorder is the most prevalent disorder especially seen especially in women in these years. The normal thyroid gland functioning is interrupted due to thyroid disorder and results in abnormal thyroid hormone production that leads to hypothyroidism. According to one of the survey, about 30% of individuals with hypothyroidism were unaware of their illness. Therefore, the majority of people have thyroid problems. As a result, they cannot cope with thyroid problems and do not seek the correct therapy. Traditional hypothyroidism treatment aims to minimize complications by controlling dyslipidemia, TSH levels, and thyroxine dose. According to the survey led by the Indian thyroid society, thyroid disease is the ninth ranked disease. Replacing the thyroid hormones is safe and effective treatment methods as it effectively manages the thyroid symptoms and prevents further complications. There are several prescription procedures used to treat this condition, but they all have adverse effects. Antithyroid therapy is available on the market today, although the prescription and side effects are severe. Antithyroid hormone replacement drugs can only be used as a last resort for general wellbeing, as they can cause side effects to the patient. Intake of thyroid medicines reduces the thyroid hormones, “thyroxine and triiodothyronine”. Intake of medications over extended periods, often years, or even a lifetime. These drugs damage the liver, expose the body to bacteria, increase allergic reactions such as skin rashes, and early death is the worst case scenario. As a result, there is a critical need to raise thyroid condition awareness and expand care options. The thyroid gland produces thyroxine (T4) (four iodine atoms), and triiodothyronine (T3) (three iodine atoms) hormones. *Yoga* is one of the great exercise forms where; *āsana, prāṇayāma*, meditation and chanting have been shown to reduce stress levels by stimulating hormone health, pituitary and pineal glands. Thyroid disorder is mainly caused by an irregular lifestyle and can be addressed using an Integrated Approach of *Yoga* Therapy (IAYT). Though tentative research indicates that *yoga* can help with personality formation, cognitive skills, and the treatment of psychosomatic

disorders in thyroid patients, no randomized control trial with a broad enough sample size has been performed.

AIM AND OBJECTIVES

AIM AND OBJECTIVES OF DESIGN 1

Aim of the study:

To develop an Integrated *Yoga* module for hypothyroidism.

Objective of the study:

Customization and validation of the IAYT module for the hypothyroid problem.

AIM AND OBJECTIVES OF DESIGN 2

Aim of the study:

- To study the effect of an Integrated Approach of *Yoga* Therapy on hypothyroidism.

Objectives of the study:

- To study the changes in thyroid function and related parameters before and after IAYT *yoga* intervention.
- To study the effect of IAYT on Weight, BMI, and Quality of Life and their correlation with IAYT *yoga* intervention of subjects suffering from hypothyroidism.

METHODS

Participants

A population mix of seventy four men and women clinically diagnosed with hypothyroidism was considered for this study.

Design

Two groups were formed with seventy four hypothyroidism subjects, namely IAYT *yoga* intervention and waitlist control groups. Five sessions for five days were offered per week for the IAYT *yoga* intervention group, where ninety minutes

yoga course was carried out for five sessions a week for over 90 days as a complementary therapy to thyroid dysfunction. No type of exercise or physical activity is suggested to waitlist control group subjects during the study period. Once the study period is completed, and post data is collected, IAYT intervention provides for control group subjects, and the subject's lifestyle and diet routine will be maintained in a record. In addition, at the beginning and end of the program, the World Health Organisation – WHO BRIEF's, the Quality of Life was evaluated.

Assessments

Parameters such as "T3, T4, TSH, Free T3, Free T4, TPO, Tg Antibody, SHBG, Cortisol, CRP, Weight, BMI, and Quality of Life" were assessed. In addition, data on thyroid parameters were obtained by laboratory test reports. With the Body Mass Index (BMI), height details and Weight details, of subjects was calculated. Data on Quality of Life is calculated using WHO BRIEF (World Health Organization) Questionnaire.

Intervention

The *yoga* IAYT intervention (independent variable) is a personalized IAYT based *yoga* sequencer (attachment 3.0 and 4.0) for this research project that tackled problems at the *pañca kośa* level and included prayers/chanting, relaxations, meditations, *prāṇayāma*, *āsanās*, and awareness stage. Subjects in the waiting list control group take their thyroid medications and go about their daily routines as usual. Three months of IAYT *yoga* intervention, five days per week and one and half hour a day was provided to IAYT *yoga* participants. Opening prayer, breathing exercise, loosening practice, *āsanās* (static physical postures), *sūrya namaskāra* (Sun salutation), *prāṇayāma* (scientific method of regulating breath), calming activities, reflection and awareness point, *banda*, *mudra*, and *kriyās* are all included in each class. A progressive training intervention load was introduced,

including exercise, complex grades, and repeated from the beginning to the last training cycle. There are a few *yoga* exercises that cannot be practiced daily, although some need time. Clear procedures were applied at the beginning of the preparation. On the other hand, the waitlist control group suggests no exercises or other physical activities; they are just advised to follow their daily routine. The lifestyle and diet details before and during the program determined by WHO BRIEF questionnaire were tracked in the general record logbook. The IAYT *yoga* training protocol was described in depth elsewhere. All of the activities in this module were designed to increase physical activity and metabolic rate, reduce muscle tone, facilitate toxin removal, aid in the proper secretion of digestive enzymes, and improve the digestive system, particularly the liver, assist in the improvement of bodily and mental rest, aids in the relief of mental stress and tension, which is the leading cause of thyroid disorders, aids in the advancement of physical and psychological health both of the rituals, as well as the *om* chanting vibration (frequency), produce chemical hormones that stabilize the body and have healing, mental, behavioral, and psychological consequences.

Results

The paired sample t-test for normal distribution for within the group showed significant reduction in TSH (p=0.000, 48.34%), Cortisol (p=0.000, 31.46%), CRP (p=0.000, 47.06%), Weight (p=000, 5.76%) and BMI (P=000, 5.71%), highly significant reduction in TPO Antibody (p=0.001, 52.93%) and significant reduction in Tg Antibody (p=0.013, 54.64%) and significant increase in T3 (p=0.000, 44.51%), T4 (p=0.000, 21.82%), Free T3 (p=0.000, 26.26%), Free T4 (p=0.000, 24.96%) and Quality of Life (p=0.000, 31.14%) and significant increase in SHBG (p=0.012, 39.33%). Independent measure t-test for normal distribution for between the groups shows decrease in TSH (p=0.000), Cortisol (p=0.000) and CRP (p=0.000) is found to be significant decrease and on variables TPO Antibody (p=0.032) and Tg Antibody (p=0.036) it is found to be significant decrease and increase in T3 (p=0.000), T4 (p=0.000), Free T3 (p=0.000), Free T4 (p=0.000) and

Quality of Life (p=0.000) shows significant increase and variable SHBG (p=0.012) it is found to be significant increase. Weight (p=0.069) and BMI (p=0.101) shown positive improvement but not significant. RM ANOVA confirms the same results.

Conclusion

The Integrated Approach of *Yoga* Therapy has an exponentially meaningful impact on T3, T4, TSH, Free T3, Free T4, SHBG, and CRP. It is imperative on the vector TPO Antibody, and it is significant on the factors Tg Antibody and Cortisol. The IAYT has been shown to have a protective effect on thyroid issues, Weight and BMI show positive changes but are not significant. Quality of Life shows positive changes.

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