

Development of a Yoga Module for Hypothyroidism

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ABSTRACT

Introduction: Prevalence of hypothyroidism is found high in India in the recent years and is more commonly seen in women. While treating the condition with pharmacological intervention, importance of exercise, diet and lifestyle modifications play a significant role in managing the condition. Yoga based techniques have shown positive impact in managing hypothyroid related symptoms. Yoga when considered as a therapeutically approach needs to be customised by considering specific yogic techniques for the targeted health condition and it is also essential to validate the yoga module for a given health condition. While there are a few validated yoga modules for managing obesity, backpain etc., there are no validated yoga modules for treating/managing hypothyroid condition.

Aim: To develop an integrated yoga module for hypothyroidism.

Materials and Methods: Integrated yoga module has been designed based on traditional yoga literature and expert opinion. Based on the *pancha kosha* model (five layered existence),

53 yogic techniques were compiled and sent to 36 experts for content and face validation. Experts validated each technique by rating the relevance on a five point likert scale. Validated techniques were administered to a group of 35 women having hypothyroidism to ascertain acceptance and the possibility of practice of said techniques. Content Validity Ratio (CVR) and the average of mean, mode and median of scores were calculated. Data analysis was done using Statistical Package for the Social Sciences (SPSS) software version 23.

Results: Out of the 53 techniques, 41 techniques scored either CVR more than 0.5 or average of mean, median and mode more than 4.

Conclusion: The developed integrated yoga module for hypothyroidism enjoys good face and content validity. Initial feasibility test confirms that the techniques are accepted and could be practiced by the hypothyroid patients. Further validation of the module using a pre-post study is warranted to confirm its efficacy.

Keywords: Hypothyroid, Integrated approach of yoga therapy, *Pancha kosha* concept, Validation of yoga module, Yoga therapy for hypothyroidism

INTRODUCTION

Various studies project high prevalence of hypothyroidism in the recent years in India and more so high and common in women [1]. Hypothyroidism, evidenced by less secretion of thyroid hormones, if left untreated, can cause elevated cholesterol levels, an increase in blood pressure, cardiovascular complications, decreased fertility, and depression [1]. Weight gain, fatigue, disturbed mental state and low immunity are associated with hypothyroidism [1,2]. In India and USA standard treatment for hypothyroidism includes levothyroxine (T₄), liothyronine (T₃), liotrix for daily usage. This medication brings back required hormone levels and maintain the sign and symptoms of hypothyroidism. The available anti-thyroid medication is associated with severe harmful side effects [1,3].

Yoga is popular as a complementary and in some cases as an alternative therapeutical approach for many psychosomatic health conditions. Yogic concept of human existence comprises of five sheaths (*koshas*) known as gross body (*annamaya kosha*), energy body (*pranamaya kosha*), emotional body (*manomaya kosha*), intellectual body (*vijnanamaya kosha*), and bliss body (*anandamaya kosha*). Selection of specific yogic practices for a particular health condition and to validate the recommended techniques is very essential when yoga is considered as a therapeutical approach. Yogic techniques are innumerable and considering their predominant influence on different *koshas*, yogic techniques are broadly classified as detailed below.

- *Annamaya kosha*- *Asanas* (physical postures), *Kriyas* (internal organs cleansing techniques), *Ahara* (diet).
- *Pranamaya kosha*- *Pranayamas* (breathing techniques), *Mudras* (yogic gestures), *Bandas* (yogic locks).
- *Manomaya kosha*- *Dhyana* (meditation), *Bhajans* (chanting).

- *Vijnanamaya kosha*- *Jnana yoga* (knowledge points), *Hithopadesha* (Yogic counseling), *Satsanga* (sacred gathering).
- *Anandamaya kosha*- *Karma yoga* (self-less service), *Yoga nidra* (deep relaxation) [4].

The Integrated Approach of Yoga Therapy (IAYT) is a holistic and an integrated approach that comprises of combination of various yogic practices at each level to manage different health conditions and related symptoms [4]. Yoga studies have reported benefits in alleviating many health conditions associated with hypothyroidism such as obesity, stress and depression [5,6]. While these studies provide positive impact of yoga on personality development, enhancing cognitive abilities, managing psychosomatic conditions in thyroid patients, they lack in providing substantial evidences due to weak design and methodology [5,6]. The yoga module used in these studies varies with different combination of yogic techniques and practices. Available studies also indicate non-availability of a validated IAYT module for hypothyroidism. The objective of this work was to identify and validate specific yogic techniques that are known to help in effectively managing hypothyroid condition and its symptoms.

MATERIALS AND METHODS

Design: A descriptive, systematic work of developing an IAYT yoga module to treat hypothyroidism was initiated. This work is part of a bigger study for which ethical clearance was obtained by S-VYASA University vide number RES/IEC-SVYASA/137/2019. A pre-post two group intervention study which will be conducted in due course.

Hypothyroid condition anchored in *pancha kosha* concept (five layers of human existence) as stated in *Thaittiriya Upanishad*, the module addresses the issues related to hypothyroidism at physical, psychological, social and spiritual domains. The yogic techniques

proposed in the module intended to be learnt and practiced in a period of three months with 90 minutes session of supervised practice per day and five days in a week.

Kosha wise techniques that are known to be effective for managing hypothyroid condition are considered for development of IAYT program. In order to bring variation, to eliminate monotonous feeling and also to manage the time, practice of techniques is taught to each participant depending on ability to do and learn. In general the 90 minutes session includes loosening exercises- head to toe covering all major joints, *Surya namaskars* (6-12 rounds), standing *asanas* (2 no's), sitting *asanas* (2 no's), prone *asanas* (2 no's), supine *asanas* including inverted postures (4 no's), *Pranayama's* (2 no's), meditation (1 no) and relaxation techniques (3 types).

Module development process was carried out in three steps.

Step 1: Construction of the module

Considering the clinical features of hypothyroidism, its pathways and the principles of IAYT, a structured set of yogic practices were listed out along with a brief note [Table/Fig-1]. In particular the focus was mainly drawn considering yogic techniques that reap specific benefits as detailed below.

- Activates, massages, tones, stretches, relaxes the thyroid gland area.
- Improves the digestion, helps in proper secretion of digestive enzymes, strengthens digestive system and in particular the liver.
- Promote elimination of toxins mainly through exhalation, sweating and excretion.
- Techniques that promote emotional intelligence, calmness and tranquility of mind, sharpens intellect.

The yogic techniques were identified based on the thorough review of yogic texts and scientific papers related to hypothyroid condition [1,5,6]. The draft module contained details of the yogic technique, recommended number of rounds of practice and also approximate time taken to practice. Against each technique, necessary justifications were provided based on referring to scientific papers, various yogic texts [7-10], expert consultation and empirical knowledge. It also included columns (five-point Likert) to indicate the relevance and comments against each technique. Column 1-not relevant; 2-little relevant; 3-moderately relevant; 4-very relevant; 5-extremely relevant. The module also had a section at the end to provide the comments of reviewer. Detailed module with yogic practices relevant to each sheath is provided in [Table/Fig-1].

Step 2: Validation of the module

Fifty subject matter experts (SMEs) were approached requesting to validate the model. Ten medical practitioners declined due to paucity of time. Four yoga experts did not return the form. In total, the module was validated by 36 SMEs which included six yoga experts (four PhD yoga scholars and two yoga experts with more than 15 years of experience), 10 medical practitioners (allopathy, *ayurveda* and naturopathy), eight researchers (MDs and PhDs), 12 yoga therapists (M.Sc./DYT in yoga therapy). Written consent was obtained from all the experts who validated the module. Face validity, content validity and relevance of each technique was obtained from each expert.

Step 3: Analysis of the data

The data obtained from the 36 experts was analysed and CVR and average of mean, mode and median of relevance scores using SPSS software version 23. Content validity ratio was calculated using formula $CVR = (N_e - N/2) / (N/2)$, where N_e is the number of panelists indicating 'essential' and N is the total number of panelists. Standard deviation and mean and standard deviation of mean, median and mode was also calculated. The techniques which had CVR ratio <0.5 and/or average of mean, median and mode <4 were excluded. These low value results are starred. Cronbach alpha value was calculated to assess the internal consistency.

FEASIBILITY STUDY

The validated module was administered to a group of 35 women with hypothyroid condition as a pilot study to assess the acceptance and feasibility of performing the postures and other yogic techniques. The women aged between 25-50 years, having clinically diagnosed hypothyroidism and were under either allopathic or *ayurvedic* or homeopathic treatment were considered for this feasibility check. Women who had any surgery done in the last six months, pregnant women and who have physical impairment or medical conditions that interfere in administration of tools or IAYT yoga module were excluded from the study. Written consent was obtained from each participant. All the participants were able to perform all the practices under supervision. The duration to perform each technique was also assessed which is in line with the suggested duration against each technique. The study conducted at reputed yoga institution.

	Description	No. of rounds	Duration min.	Justification	Relevance					Comments
					1	2	3	4	5	
	1-not relevant; 2-little relevant; 3-moderately relevant; 4-very relevant; 5-extremely relevant									
	ANNAMAYA KOSHA PRACTICES:									
	Breathing practices:									
1	Hands in and out breathing	5	1	Establishes coordination between body, breath and mind						
2	Dog breathing	5	1	Activates respiratory tract, thyroid glands, and abdomen muscles. Cleanses, detoxifies and enhances supply of oxygen to brain and feeling of alertness.						
3	Tiger breathing	5	1	Improves flexibility of spine and abdominal muscles. Tones the spinal nerves and stimulates blood circulation and digestion						
4	<i>Shasankasana</i> breathing	5	1	Relieves fatigue, anxiety and induce calmness. Activates throat area and chest region. Provide gentle massage to digestive organs.						
5	Straight leg rise breathing (Alternative legs)	5	1	Burns excess fat of thigh and hip muscles, activates digestive fire. Tones and strengthen abdomen muscles.						
	Loosening exercises:									
6	Jogging (four variations)		2	Warming up the body, increases aerobic fitness, burns calories, sweat.						
7	Forward and backward bending	10	0.20	Reduces stress, anxiety, depression, and fatigue.						
8	Lateral bending	10	0.20	Revitalises and massages the liver, pancreas and kidneys.						
9	Twisting	10	0.20	Provides squeeze-and-soak action. Stimulate circulation and induces cleansing and refreshing effect on the torso organs and associated glands. Strengthens and detoxifies the liver and abdominal region.						

10	<i>Pavanmuktasana kriya</i>	5	2	Stimulate bowel movement, releases the trapped digestive gases, enhances digestion and excretion processes.						
11	Neck bending (four variations, each five rounds)	5	1	Massages the tension triangle muscles (head-neck-shoulder), relieves stiffness and stress, boosts blood circulation. Activates throat and neck region.						
Surya namaskara										
12	<i>Surya namaskara</i> (sun salutation)	12	9	Activates more than 80% of musculo-skeletal system and various systems. Burns calories, relieves stress and tension.						
Yogasana-standing										
13	<i>Ardakati chakrasana</i> (Half wheel lateral bending posture)	1	1	Strengthens liver and improves its function. Reduces fat and tones the waist.						
14	<i>Parshvottanasana</i> (Both sides)	1	1	Contracts and tones the abdomen, helps deep breathing, calms the mind. Strengthens core muscles, lower extremities, reduces stress.						
15	<i>Trikonasana</i> (triangle posture)	1	1	Increases physical and mental stability. Strengthens core and digestive muscles and reproductive organs.						
16	<i>Virabhadrasana1</i> (warrior pose)	1	1	The neck is extended and thyroid and the parathyroid glands are massaged. Enhances immunity, activates liver and pancreas.						
Yogasana-sitting										
17	<i>Yoga mudrasana</i>	1	1	<i>Tri-Bandas</i> strengthen throat, abdominal and gonadal region. Eliminates stress, brings calmness.						
18	<i>Navasana</i> (boat pose)	1	1	Strengthens core muscles. Revitalises the endocrine system						
19	<i>Pascimottanasana</i> (seated forward bend)	1	1	Creates pressure on the thorax and abdomen, improves the functions of the intra-abdominal glands especially the secretions.						
20	<i>Janu shirshasana</i> (both sides)	1	2	Improve circulation. Massages the abdominal organs, improve digestion and elimination, tones reproductive organs and the kidneys.						
21	<i>Ustrasana</i> (camel pose)	1	1	Detoxifies the body and enhances circulation. Improves appetite, digestion, and excretion. The deep stretch stimulates thyroid glands and improves its functioning.						
22	<i>Gomukasana</i> (cow face pose)	1	1	Diagonal stretch purifies all chambers of lungs. Reduce stress and anxiety. Subtle twist and compression of abdominal organs increases body breath awareness. Massages and stimulate kidneys						
23	<i>Marichasana</i>	1	2	Tones the abdominal organs, relives fatigue						
24	<i>Baradvajasana</i>	1	2	Gentle twist from the base of the spine reduces the stress. Parasympathetic nervous system is boosted.						
Asanas-prone										
25	<i>Shalabasana</i> (locust pose)	1	1	Improves peristalsis in the large intestine and especially in the large portion of the colon. Improves appetite.						
26	<i>Bhujangasana</i> (Serpent pose)	1	1	Deep neck stretched improves functioning of the thyroid glands. The pressure on the abdomen is beneficial for stimulating appetite, better digestion and to relieve flatulence and constipation.						
27	<i>Makarasana</i> (Crocodile pose)	1	1	Relaxative pose, reduced stress, blood pressure						
Asanas-supine and inverted										
28	<i>Setubandasana</i> (<i>Kandarasana</i>)	1	1	Leads to suitable massage to the neck. In fact, it helps to regulate the functions of thyroid gland thereby helpful in releasing thyroxin hormone.						
29	<i>Sarvangasana</i> or <i>Viparitakarani</i>	1 to 3	3	Blood circulation is centered towards the thyroid gland. Poses rejuvenating effect and relieving stress. Enormous pressure on thyroid gland, parathyroid glands and cervical vertebra regulate functions of all most all systems and glands.						
30	<i>Matsyasana</i> (fish pose)	1 to 2	2	Relieves tension in neck, throat, and shoulders. Increased blood circulation, toning of muscles and nerves of thyroid gland region. Strengthen the posterior ligaments and muscles.						
31	<i>Halasana</i> (plough pose)	1	1	Creates pressure on the nerves in the neck region. Activates and improves the function of the thyroid, parathyroid, adrenal, and pituitary glands. Strengthens the immune system						
Kriyas-internal organs cleansing techniques										
32	<i>Jalaneti</i> (both nostrils)	1	1	Activates the thyroid gland and balances the <i>nadis</i> . Reducing tension in all the facial musculature as well as in the whole-body mind complex.						
33	<i>Vamanadhauthi</i> (using warm saline water)	1	5	Relieves clogged up digestive system, over taxed bowels, and depleted liver. Experience of mental and physical lightness, increased vital energy and clarity of mind.						
Ahara-diet										
34	Yogic diet and nutrition related topics		5	Promote balanced diet, gluten and dairy product free food. Yogic concept of eating- what to eat, when to eat, where to eat, how to eat, how much to eat, in what mind state to eat and in what mind state to prepare the food. Mindful eating and disciplined eating.						
PRANAMAYA KOSHA PRACTICES										
Pranayamas										
35	<i>Ujjayi</i>	9	1.5	Constriction of glottis and throat region stimulates and relaxes the thyroid glands. Invigorates the nervous system and improves function of all endocrine glands.						

36	<i>Bhastrika</i> (deep breath in and forceful exhalation)	80-100 strokes	1.5	Generates heat, vigor and vitality. Speeds up the metabolism and helps burning of fat. Removes fatigue.						
37	<i>Nadi shuddi</i> (alternative nostril breathing)	6	1.5	Useful in balancing metabolism through its effects on <i>Ida</i> and <i>Pingala nadis</i> . Deeper breathing enriches oxygen supply. Balances the secretions and all activities including sympathetic and para sympathetic tone.						
38	<i>Bhramari</i>	9	1.5	Voluntary prolongation of breath stretches the thyroid gland. Induce calmness, relieves stress, generates positive vibration which rejuvenates nervous and endocrine systems.						
39	<i>Suryabedana</i> (right nostril breathing)	9	1.5	Stimulate the blood circulation- optimal circulation in liver mobilises out the metabolic toxic product from the organs.						
40	<i>Vibagiya swasha</i> (sectional breathing)	9	1.5	Activate different lobes of lungs thereby improves lung capacity. Increased lung capacity implies more oxygenated blood supply to cells and optimal metabolic activity. Ignites digestive fire, activates the muscles of abdomen, thoracic and clavicular region.						
Mudras										
41	<i>Viparita karani</i> (in asana section)		3	Incorporates <i>ujjayi pranayama</i> and awareness of psychic passages.						
42	<i>Agnimudra</i> (during pranayama practice)			Increases heat circulation in the body. Enhanced metabolic activity and digestion.						
Bandas										
43	<i>Jalandara banda</i>	1	1	Compressing the thyroid and parathyroid glands provides an effective way to massage these glands to optimise their function.						
44	<i>Uddiyana banda</i>	1	1	Tones and massages the liver and digestive organs. Ignites digestive fire, enhanced secretion of digestive enzymes. Regulate the functions of digestion and excretion.						
MANOMAYA KOSHA PRACTICES										
Meditation practices										
45	<i>Nadanusandhana</i> (Chanting of A, U, M)	5	3	Activates the throat, chest and abdominal region; specially rejuvenates thyroid glands, activates thymus glands and regulates adrenalin glands. Lengthens the breath. Positive vibrations stimulate the healing effect.						
46	<i>Om</i> meditation (chanting of <i>omkara</i>)	30	5	Induces tranquility and relaxation, reduces the thought process in particular speed of racing thoughts. Rejuvenating and pacifying. Lengthens the breath. Gently massages the throat and thyroid gland. Alleviates tension, fear and depression. Reduces stress. Improves secretion of feel good hormones.						
47	<i>Bhajans</i> and patriotic songs		4	Vibrations act as a healing therapy. Relieves the stress, helps developing virtues. Provokes compassion. Elevated vibrations tune various levels of intelligence.						
48	Opening and closing prayers		3	Opening prayer invites the mind into the activity. Closing prayer consolidates, connects and binds the benefits.						
VIJANAMAYA KOSHA PRACTICES										
49	Knowledge points (these points are driven either during practicing <i>asana</i> or just before concluding the session)		8	Promote disciplined life style, promoting life style modification based on <i>yama niyama</i> concepts. Encourage practice (<i>abhyasa</i>) of virtues and disassociate (<i>vairagya</i>) from vices. Yogic counseling (need based). <i>Satsanga</i>						
ANANDAMAYA KOSHA PRACTICES										
50	<i>Karma</i> yoga practices			Promote selfless service, do your duty without expecting the returns.						
51	Instant relaxation technique	1	1	Induce relaxation to the body and mind, helps in calming down the mind, expansion of mind; merge with the infinity						
52	Quick relaxation technique	1	2							
53	Deep relaxation technique	1	6							

[Table/Fig-1]: Proposed integrated yoga module for hypothyroidism.

RESULTS

Out of the 53 techniques evaluated, 41 items scored either CVR more than 0.5 and/or average of mean, median and mode more than 4. (CVR score less than 0.5 in 11 items and average was less than 4 in one item). In total 12 items were excluded from the list. The final module included all techniques other than the scores that are started in [Table/Fig-2]. Internal consistency calculated using Cronbach's Alpha for the final 41 items, recorded 0.904. The final module includes the following IAYT techniques are, **Breathing Exercise:** Dog Breathing, Tiger Breathing, *Shashankasana* Breathing. **Loosening Exercise:** Forward and backward bending, Lateral bending, Twisting, *Pavanmuktasana Kriya*, Neck bending, **Suryanamaskaras Asanas:** *Ardakati chakrasana*, *Trikonasana*, *Yoga Mudrasana*, *Navasana*, *Pascimottanasana*, *Janu shirshasana*, *Ustrasana*, *Bujangasana*, *Makarasana*, *Setubandasana*, *Sarvangasana*, *Matsyasana*, *Ustrasana*. **Kriyas:** *Jalaneti*, *Vamana dhauthi*. **Yogic Diet, Pranayama:** *Ujjayi*, *Bhastrika*, *Nadishuddi*, *Bhramari*, *Suryabedana*, *Vibagiya Swasha* and *Nadanusandana*. **Mudras:** *Viparita Karani*. **Bandas:** *Jalandarabanda*

and *Uddiyana banda*. **Meditations:** *Om* Meditations. Opening and closing prayers, Yogic counseling, Instant Relaxation Technique, Quick Relaxation Technique and Deep relaxation Technique.

DISCUSSION

In general, yoga is a holistic and integrated therapeutical approach that integrates physical, psychological, social and spiritual components of health and wellbeing. It is regarded as a form of mind body remedy to develop factors of fitness, mainly stress related ailments [1,5,6,11]. Normal practice of yoga is thought to beautify muscular power and body flexibility, promote and progress respiration and cardiovascular feature, help the recovery from and treatment of depression, addiction, anxiety, and reduce stress and strain and chronic ache, improve quality of sleep, and beautify total wellbeing and quality of existence [12].

Empirical knowledge and therapeutical benefits of certain yogic practices are known for enhancing the functioning of thyroid glands, gut and liver. Yogic practice also provides relaxation to body which

Sl. No.	Yogic techniques	Mean M	Median M	Mode M	Standard deviation	Average of mean, median, mode	Standard deviation of MMM Mean	CVR
1	Hand stretch breathing	3.61	4.00	4.00	0.87	3.87**	0.22	0.17*
2	Dog breathing	4.11	4.00	4.00	0.98	4.04	0.06	0.72
3	Tiger breathing	4.81	5.00	5.00	0.40	4.94	0.11	1.00
4	<i>Shashankasana</i> breathing	4.44	5.00	5.00	0.97	4.81	0.32	0.89
5	Straight leg raise breathing	3.81	4.00	4.00	0.95	3.94	0.11	0.33*
6	Jogging	4.00	4.00	5.00	1.07	4.33	0.58	0.44*
7	Forward and backward bending	4.33	4.00	4.00	0.68	4.11	0.19	0.78
8	Lateral bending	4.22	4.00	4.00	0.87	4.07	0.13	0.78
9	Twisting	4.33	4.00	4.00	0.59	4.11	0.19	0.72
10	<i>Pavanmuktasana kriya</i>	4.50	5.00	5.00	0.74	4.83	0.29	0.89
11	Neck bending	4.86	5.00	5.00	0.35	4.95	0.08	1.00
12	<i>Suryanamaskaras</i>	4.75	5.00	5.00	0.60	4.92	0.14	0.83
13	<i>Ardakati chakrasana</i>	4.33	4.00	4.00	0.68	4.11	0.19	0.78
14	<i>Parsvottanasana</i>	3.81	4.00	4.00	1.06	3.94**	0.11	0.33*
15	<i>Trikonasana</i>	4.28	4.00	4.00	0.66	4.09	0.16	0.89
16	<i>Virabhadrasana 1</i>	3.97	4.00	4.00	1.06	3.99**	0.02	0.56
17	<i>Yoga mudrasana</i>	4.06	4.00	4.00	0.98	4.02	0.03	0.56
18	<i>Navasana</i>	4.03	4.00	5.00	1.11	4.34	0.57	0.61
19	<i>Pascimottanasana</i>	4.33	5.00	5.00	1.01	4.78	0.38	0.67
20	<i>Janu shirshasana</i>	4.06	4.00	4.00	0.98	4.02	0.03	0.56
21	<i>Ustrasana</i>	4.83	5.00	5.00	0.56	4.94	0.10	0.83
22	<i>Gomukasana</i>	3.44	4.00	4.00	1.30	3.81**	0.32	0.06*
23	<i>Marichasana</i>	3.36	3.50	4.00	0.99	3.62**	0.34	0.00*
24	<i>Baradvajasana</i>	3.17	3.00	3.00	1.13	3.06**	0.10	0.33*
25	<i>Shalabasana</i>	3.78	4.00	5.00	1.44	4.26	0.65	0.28*
26	<i>Bhujangasana</i>	4.92	5.00	5.00	0.37	4.97	0.05	0.94
27	<i>Makarasana</i>	4.42	5.00	5.00	1.00	4.81	0.34	0.72
28	<i>Setubandasana</i>	4.89	5.00	5.00	0.40	4.96	0.06	0.94
29	<i>Sarvangasana</i>	4.97	5.00	5.00	0.17	4.99	0.02	1.00
30	<i>Matsyasana</i>	4.83	5.00	5.00	0.56	4.94	0.10	0.94
31	<i>Ustrasana</i>	4.83	5.00	5.00	0.56	4.94	0.10	0.83
32	<i>Jala neti</i>	4.14	4.00	5.00	0.93	4.38	0.54	0.61
33	<i>Vamana dhauthi</i>	4.22	5.00	5.00	1.31	4.74	0.45	0.61
34	Yogic diet	4.83	5.00	5.00	0.38	4.94	0.10	1.00
35	<i>Ujjayi</i>	5.00	5.00	5.00	0.00	5.00	0.00	1.00
36	<i>Bhastrika</i>	4.39	5.00	5.00	0.73	4.80	0.35	0.72
37	<i>Nadishuddi</i>	4.72	5.00	5.00	0.51	4.91	0.16	0.94
38	<i>Bhramari</i>	4.75	5.00	5.00	0.94	4.92	0.14	0.89
39	<i>Suryabedana</i>	4.25	4.00	5.00	0.87	4.42	0.52	0.67
40	<i>Vibagiyi swasha</i>	4.14	5.00	5.00	1.17	4.71	0.50	0.56
41	<i>Viparita karani</i>	4.86	5.00	5.00	0.42	4.95	0.08	0.94
42	<i>Agni mudra</i>	3.97	4.00	5.00	1.03	4.32	0.59	0.28*
43	<i>Jalandara banda</i>	4.97	5.00	5.00	0.17	4.99	0.02	1.00
44	<i>Uddiyana banda</i>	4.28	4.50	5.00	0.81	4.59	0.37	0.56
45	<i>Nadanu sandhana</i>	4.81	5.00	5.00	0.40	4.94	0.11	1.00
46	<i>Om</i> meditation	4.58	5.00	5.00	0.73	4.86	0.24	0.72
47	<i>Bhajans</i> and patriotic songs	3.89	4.50	5.00	1.28	4.46	0.56	0.28*
48	Opening and closing prayers	4.39	5.00	5.00	0.87	4.80	0.35	0.72
49	Yogic counselling	4.72	5.00	5.00	0.61	4.91	0.16	0.83
50	<i>Karma yoga</i>	3.78	4.00	5.00	1.42	4.26	0.65	0.44*
51	Instant relaxation technique	4.61	5.00	5.00	0.96	4.87	0.22	0.89
52	Quick relaxation technique	4.47	5.00	5.00	1.00	4.82	0.30	0.61
53	Deep relaxation technique	4.86	5.00	5.00	0.35	4.95	0.08	1.00

[Table/Fig-2]: Yogic technique wise statistical results (n-36).

*CVR values less than 0.5. **Mean less than 4. N: Number of experts

brings calmness in the mind and reduces the stress. Yoga also promotes balanced lifestyle and diet [4,8-12]. The present work of developing yoga module for hypothyroidism involves through understanding of anatomical and physiological dynamics of hypothyroid condition in order to select appropriate yogic techniques to manage hypothyroid condition [4,6,8-10].

The developed IAYT program to treat/manage hypothyroid condition comprises of yogic techniques that addresses the issues related to hypothyroid condition at different *koshas* or sheaths. It is a holistic and integrated program. The novelty of this module development process relayed on understanding the anatomy, physiology, pathways and dynamics of hypothyroid condition and identifying appropriate yogic technique considering all the *koshas* to address the issues in a holistic way ([Table/Fig-1] and [Table/Fig 2]). Thyroid is one among the most common diseases prevalent in the recent years and is more commonly seen in women. With early diagnosis and treatment, one can manage symptoms like weight gain, fatigue, increased sensitivity to cold, constipation etc., and prevent complications like heart problems, mental health issues, infertility, birth defects etc., [4,5,13]. Yoga which started as a complementary therapy is slowly progressing towards considering it as an alternative therapy for many health conditions like low back pain, asthma, diabetes mellitus, high blood pressure etc. In this direction, it becomes essential and important to focus on customising or developing a validated yoga module for specific health conditions. To study the effect of yoga on thyroid dysfunction, very few studies are available [1,5,6,13,14,15]. In a study of 20 subjects having thyroid condition, yoga was found effective in addressing problems such as weight gain, tiredness, hair loss, constipation, weight loss, tremor, laziness and improper hormone level [13]. The yogic practices brought changes in the thyroid disordered patients. One can see the variation in the Triiodothyronine (T3), Tetraiodothyronine (T4) and Thyroid Stimulating Hormone (TSH) after yoga practice [13]. The module used in this study includes practices 26 *asanas*, four *pranayama*'s, one *kriya*, one *banda* and two relaxation techniques [13]. A case report found that yoga is beneficial for maintaining thyroid level normal [14]. Another study shows that yoga is precious in serving the hypothyroid sufferers to accomplish their disorder related symptoms. The yoga module in this study was *surya namaskara* (dynamic physical posture), *shitalikarana* (loosening), five *asanas*, six *pranayama*'s and meditation [15]. One pilot study on hypothyroidism conducted conclude that six months of practice of yoga can also assist in decreasing the thyroxin requirement in woman patients suffering low with hypothyroidism and may also help in enhancing cholesterol level and serum TSH. The yoga module in this study includes starting prayer, five *sukshma vyayama-sithilikarna vyayama*, *suryanamaskaras*, 20 *asanas*, six *pranayama*'s, one *kriya*, one Deep Relaxation Technique (DRT), one special technique Mind Sound Resonance Technique (MSRT), once a week cyclic meditation and closing prayer. There is no mention of validating and assessing the feasibility and reliability of the yoga module in the above studies. There are couple of studies validating the yoga module for various health conditions such as low back pain [16], schizophrenia [17], caregivers of psychosis [18], cancer [19], obesity [20], depression [21] obsessive compulsive disorder [22]. Each of these studies follow distinct methodology for validation of the module. The present module development has considered strengths of these studies while designing the methodology. The strength of the study lies in validation of the module by various Subject Matter Experts (SMEs) such as yoga experts, yoga therapists, endocrinologists, physicians, naturopaths, and *Ayurveda* doctors. Further these experts belonged to different organisations and institutions. The technical inputs concerning internal and biological activities related to hypothyroidism were discussed with a medical practitioner.

Out of the 53 techniques evaluated, 41 techniques scored either CVR more than 0.5 or Mean of mean, median and mode more than

4. (CVR score less than 0.5 in 11 items and Mean was less than 4 in one item). In total 12 items were excluded from the list. They are Hands stretch breathing, Straight leg raise breathing, jogging, *Parscrottanasana*, *Virabardrasana 1*, *Gomukasana*, *Marichasana*, *Baradvajasana*, *Shalabasana*, *Agni mudra*, *Bhajans* and Patriotic songs, and *Karma* yoga. The pilot study to check acceptance and feasibility of performing the yogic techniques by hypothyroid patients was carried with 35 subjects. Most of them performed all the 41 yogic practices in one and half hour time and they did not complain of any adverse effects.

Limitation(s)

Future studies could consider asserting the reliability and efficacy of the module by conducting a pre-post intervention study. Not performing other validity, reliability and clinical tests could be considered as a limitation of this study.

CONCLUSION(S)

The developed IAYT program for treating hypothyroid condition received good face and content validity and hence is valid and feasible. The practice of these techniques once by hypothyroid patients did not have any adverse effects. All subject matter professionals validating the study approved on most of these techniques and practices as appropriate. The present validation brings greater acceptability and better therapy module for hypothyroidism. However, future studies must determine the efficacy of the developed module.

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REFERENCES

- Chaudhari K and Kapse N. Review on vibration frequency developed by OM chanting and its positive effects on thyroid. *Internat J Scientific Engineering and Applied Sci.* 2017;3(6):306-12.
- Jean-Jacques S, Beat UA, Hanna E, Arnika SR, Pia T, Katharina M, et.al. Spectrum of subclinical and overt hypothyroidism. Effect on thyrotropin, prolactin, and thyroid reserve, and metabolic impact on peripheral target tissues. *Am J Med.* 1992;92(6):631-42.
- Peter AS, David SC, Paul WL, Levy, Lewis EB, Elliot GV, et al. Treatment guidelines for patients with hyperthyroidism and hypothyroidism. *JAMA.* 1995;273(10):808-12.
- Raghuram N and Hongasandra NR, *Integrated Approach of Yoga Therapy for Positive Health.* Bengaluru: Swami Vivekananda Yoga Prakashana: 2015.
- Nilakanthan S, Metri K, Raghuram N and Hongasandra N. Effect of six months intense Yoga practice on lipid profile, thyroxine medication and serum TSH level in women suffering from hypothyroidism: A pilot study. *J Complement Integr Med.* 2016;13(2):189-93.
- Chatterjee S and Mondal S. Effect of combined yoga programmed on blood levels of thyroid hormones: A quasi-experimental study. *Indian Journal of Traditional Knowledge.* 2017;16(suppl):S09-16.
- Swami Muktibodhananda, *Hata Yoga Pradipika*, Munger, Bihar: Yoga Publications Trust; 1985.
- Iyengar BKS. *Yoga the Path to Holistic Health.* London: Penguin Group (UK); 2014.
- Swami Kavalayananda, *Asanas.* Pune: Kaivalyadhama Ashram, Yoga – Mimamsa Publications; [1931].
- Raghuram N and Honagasandra NR. *Yoga.* Bengaluru: Swami Vivekananda Yoga Prakashana: 2004.
- Atkinson NL, Permeth-Levine R. Benefits, barriers, and cues to action of yoga practice: A focus group approach. *Am J Health Behav.* 2009;33(1):03-14.
- Woodyard C. Exploring the therapeutic effects of yoga and its ability to increase quality of life. *Int J Yoga.* 2011;4(2):49-54.
- Sharma K and Mahaabala P. The effect of yogic practices on thyroid functions. *Global Journal for Research Analysis.* 2016;5(8):37-39. [https://www.worldwidejournals.com/indian-journal-of-applied-research-\(IJAR\)/recent_issues_pdf/2014/July/July_2014_1404224915__165.pdf](https://www.worldwidejournals.com/indian-journal-of-applied-research-(IJAR)/recent_issues_pdf/2014/July/July_2014_1404224915__165.pdf)
- Bhavanani AB, Zeena S and Madanmohan. Effect of yoga on subclinical hypothyroidism: A case report. *Yoga Mimamsa.* 2012;43(2):102-07.
- Singh P, Singh B, Dave R, Udaniya R. The impact of yoga upon female patients suffering from hypothyroidism. *Complement Ther Clin Pract.* 2011;17(3):132-34.

- [16] Patil NJ, Raghuram N, Tekur P, Patil DN, Hongasandra RN and Pailoor S. Designing, validation, and feasibility of integrated yoga therapy module for chronic low back pain. *Int J Yoga*. 2015;8(2):103-08.
- [17] Govindaraj R, Varambally S, Sharma M, Bangalore NG. Designing and validation of a yoga-based intervention for schizophrenia. *Int Rev Psychiatry*. 2016;28(3):323-26.
- [18] Varambally S, Vidyendaran S, Sajjanar M, Thirthalli J, Ameer HH, Nagendra R and Gangadhara BN. Yoga-based intervention for caregivers of outpatients with psychosis: A randomized controlled pilot study. *Asian J Psychiatr*. 2013;6(2):141-45.
- [19] Amritanshu R, Nagarathna R, Rao RM, Hemant B, Koka PS, et al. Development and Validation of a Need-Based Integrated Yoga Program for Cancer Patients: A Retrospective Study. *J Stem Cells*. 2013;7(4):269-82.
- [20] Rathi SS, Nagarathna R, Padmini T, Ruchira RJ and Nagendra HR. Development and validation of integrated Yoga module for obesity in adolescents. *Int J Yoga*. 2018;11(3):231-38.
- [21] Naveen GH, Rao MG, Vishal V, Thirthalli J, Varambally S, and Gangadhar BN. Development and feasibility of yoga therapy module for out-patients with depression in India. *Indian J Psychiatry*. 2013;55(Suppl 3):S350-56.
- [22] Bhat S, Varambally S, Karmani S, Ramajayam G and Gangadhar BN. Designing and validation of a yoga-based intervention for obsessive compulsive disorder. *Int Rev Psychiatry*. 2016;28(3):327-33.

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