Review Article

Can Yoga Help to Manage the Symptoms of Thyroid Diseases?

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Abstract

Thyroid diseases (TD) involve impaired secretion of thyroid hormones and are more prevalent in women. Risk factors include older age, family history of thyroid disease, hypertension, obesity, pregnancy, and diabetes. Psychological manifestations such as depression and mania are closely associated with TD, necessitating a mind–body-based complementary approach like Yoga. To examine the effectiveness of Yoga on the physiological and psychological symptoms of TD. A systematic search was conducted on three databases – PubMed, Google Scholar, and Web of Science in September 2023 using the keywords (Yoga AND Thyroid Disease, Yoga AND Thyroid Disorder, Yoga AND Thyroid Disorders, etc.,) and 39 results were identified while 34 results were obtained through other sources, hence 73 in total. After removing ten duplicates, and 6 nonrelevant studies, 57 were screened. Finally, 13 studies were selected for the qualitative analysis after the inclusion and exclusion criteria were applied. 9 of 13 studies involving 389 thyroid patients focused on hypothyroidism cases only. Most common Yoga practices were suryanamaskara, bhujangasana, matsyasana, sarvangasana, halasana, ujjayi pranayama, anulomvilom/nadishodhana, bhastrika pranayama, bhramari pranayama, kapalbhati, and jalandhara bandha. Studies revealed a trend toward balance in thyroid hormone, reduction in psychological symptoms such as stress, anxiety, and depression, and improvement in the quality of life of thyroid patients through Yoga. Yoga has shown beneficial effects in managing the symptoms of TD, especially in hypothyroidism management. However, more randomized controlled trials incorporating larger sample sizes are needed to establish the results. Furthermore, there remains a dearth of research on the efficacy of Yoga in the treatment of hyperthyroidism and other TD.

Keywords: *Alternative therapy, hyperthyroidism, hypothyroidism, thyroid diseases, thyroid disorders, Yoga*

Introduction

Thyroid diseases (TD) are medical conditions of impaired production of thyroid hormones. These affect 42 million people, making it one of the most common health issues in India.[1] Thyroid hormones are crucial in regulating metabolism and affect the brain, heart, lungs, and reproductive functions.[2] Imbalance in these hormones may lead to TD like hypothyroidism or hyperthyroidism which may significantly affect one's health. TD may increase the risk of sexual dysfunctions, pre-eclampsia, perinatal mortality and miscarriage in females, erectile dysfunction, and ejaculatory dysfunctions in men while impaired libido in both men and women.[3-5]

Further, both hyperthyroidism and hypothyroidism are associated with increased risk of ischemic heart disease and cardiac mortality.[6,7] Psychological health is also compromised as TD is associated with depression, dementia, mania, and cognitive impairment.[8] Ultimately, it negatively affects the overall health and compromises the professional and financial condition of thyroid patients by increasing the risk of long-term sickness absence, unemployment, and disability pensioning.[9] In addition, diminishing earnings and excluding individuals from the labor force may impact an increasing burden on the global public health and healthcare system with increasing healthcare costs.

Iodine deficiency and Hashimoto's thyroiditis are the main causes of hypothyroidism, whereas Grave's disease is the most common cause of hyperthyroidism.[10,11] Hypertension, obesity, women, older age, family history of thyroid disease, pregnancy, and diabetes are the main risk factors for developing thyroid disorders.[12-15]

Available treatment options for thyroid dysfunctions are hormone replacement

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therapy, antithyroid medications, radioactive iodine therapy, beta-blockers to manage symptoms, and in some cases, surgery,[16] but these have side effects also. As these diseases are linked with psychological health also, a mind–body-based approach may better help to manage the health conditions in a complementary manner. Yoga, an Indian spiritual way of living, provides many health-related benefits. It is a mind–body-based therapy option that may be beneficial in the management of TD as it works holistically. The study is designed to check the effectiveness of the available literature on Yoga for TD.

Methods

Review question

Can Yoga bring change in biochemical assessments, psychological variables, quality of life, and symptoms of thyroid patients?

Participants/population

Individuals with any thyroid-related disease, regardless of gender and age, who had undergone Yoga therapy were considered in this review.

Intervention/exposure

Yogic interventions, provided independently, including any practice from asana, pranayama, meditation, and kriya, were considered. Studies were included regardless of the duration or frequency of the intervention.

Search strategy

A systematic advance search was conducted on three databases – PubMed, Google Scholar, and Web of Science databases from their inception to September 2023 using the keywords (Yoga AND Thyroid Disease, Yoga AND Thyroid Disorder, Yoga AND Thyroid Disorders, Yoga AND Hypothyroidism, Yoga AND Hyperthyroidism, Yoga AND Graves' Disease, Yoga AND Thyrotoxicosis, Yoga AND Congenital Hypothyroidism, and Yoga AND Myxoedema), and 39 results were identified. After removing ten duplicates and six nonrelevant studies, the title and abstracts of 23 studies were screened. This led to the exclusion of 17 more studies that did not meet the inclusion and exclusion criteria, resulting in 6 studies selected for review. On the other hand, 7 studies were selected from 34 studies obtained through other sources. Hence, 13 studies were selected for the qualitative review. A list of the database, keywords, and results is presented in Table 1, the PRISMA flowchart of paper extraction is presented in Figure 1, and a summarized table of all studies is presented in Table 2.

Table 1: Results after applying the keywords

Database	PubMed	Google Scholar	Web of Science
Yoga AND thyroid disease	0	0	0
Yoga AND thyroid disorder	0	1	0
Yoga AND thyroid disorders	1	2	0
Yoga AND hypothyroidism	8	17	4
Yoga AND hyperthyroidism	1	1	2
Yoga AND grave's disease	1	0	0
Yoga AND thyrotoxicosis	1	0	0
Yoga AND congenital hypothyroidism	0	0	0
Yoga AND myxoedema	0	0	0
Total=39	12	21	6

Inclusion and exclusion criteria

Inclusion criteria

(i) Yoga as a therapy, (ii) experimental study, (iii) patients with any thyroid disease with any comorbidity, and (iv) full-text published research paper in English.

Exclusion criteria

(i) Yoga with other alternative therapies/exercise except for diet or conventional treatment, (ii) no application of inferential statistics, and (iii) studies with unclear Yoga protocol.

Results

Description of the studies

After the screening process, 13 studies met the inclusion criteria, in which a total of 389 patients with TD were recruited. Only 7 studies[17,18,20,21,23,25,26] reported gender distribution with 112 (99.12%) females and 1 male (0.88%) out of a total 113 patients. Of a total of 13 studies, 6 studies examined only female patients,[17,18,20,23,25,26] 1 study examined both male and female patients,[21] and the remaining 6 studies did not mention gender distribution.[19,22,24,27-29] The age range of thyroid patients varied from 18 to 76 years. However, 221 patients (49.66%) from six studies[17,20,22,23,25,29] were between the age range of 18 to 50 years.

Three studies were case reports/series,[21,23,24] three single-group pre–post,[17,18,20] and two randomized controlled trials (RCTs),[28,29] while five were experimental controlled studies[19,22,25-27] which did not clear randomization but had a control group. 9 studies were focused on the effect of yogic practices on hypothyroidism,[17,18,20,21,25-29] one on both hyperthyroidism and hypothyroidism,[22] while single studies were focused on subclinical hypothyroidism,[23] thyrotoxicosis,[24] and anxiety level in thyroid disorders[19] each. A pictorial representation of study areas can be viewed in Figure 2.

Intervention characteristics

The overall duration of the studies ranged from 10 days to 6 months; out of those, four studies had an overall duration of 6 months. The duration of the single session was reported from 28 minutes to 4 hours, whereas six studies had 1-hour sessions. Some studies did not mention the duration of the session.[21,23,24] Most of the studies incorporated a combination of asanas, pranayama, and meditation. Six studies[17,18,20,21,28,29] included Yoga

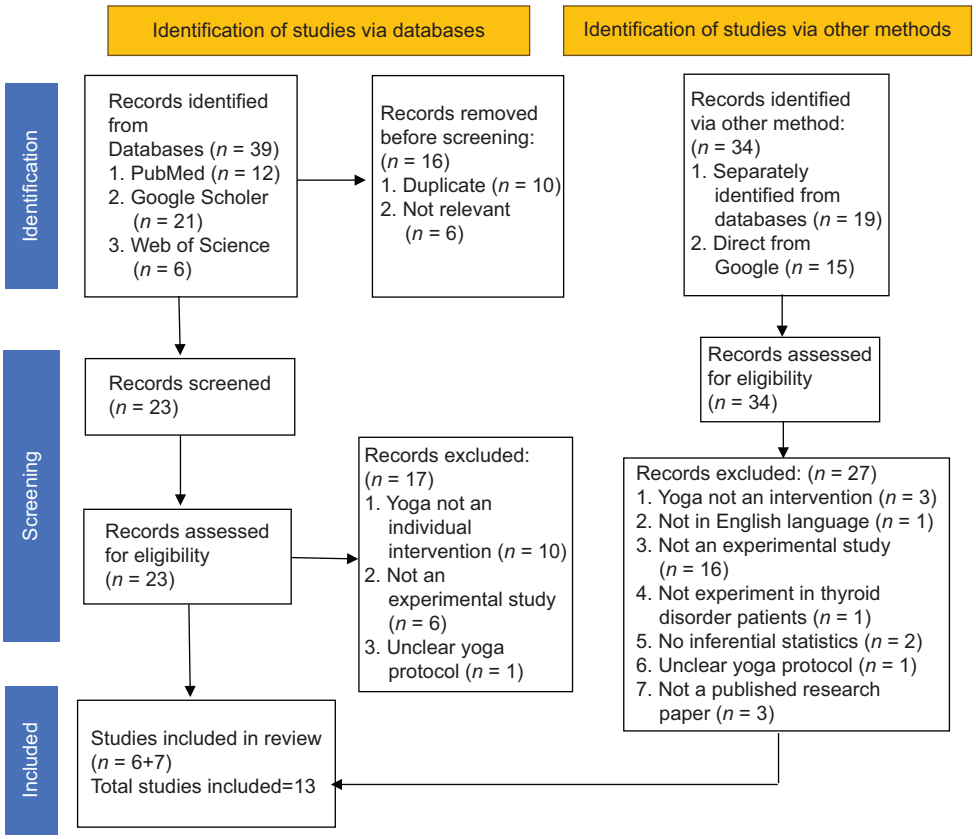

Figure 1: PRISMA flowchart of studies

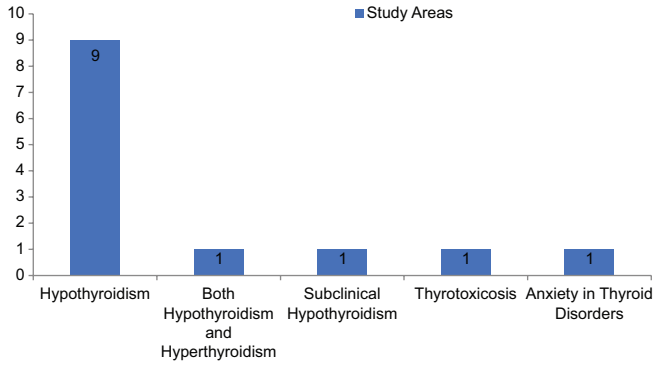

Figure 2: Study areas of Yoga in thyroid diseases

intervention along with prescribed medication, while others did not mention it. Most common practices incorporated for TD (in at least 5 studies) were suryanamaskara, bhujangasana, matsyasana, sarvangasana, halasana, ujjayi pranayama, anulomvilom/nadishodhana, bhastrika pranayama, bhramari pranayama, kapalbhati, and jalandhara bandha.

Effectiveness of intervention

Hypothyroidism and its subtypes

Among the several health-related outcomes examined in hypothyroid patients, improvement in overall quality of life,[18] reduction in stress, anxiety, depression, fatigue, LDL, TL, TR,[17,20,21,26] a decrease in TSH, and improvement in T3 and T4 levels were reported.[17,20,21,23,25,27,28]

Hyper- and Hypothyroidism

Significant reductions in levels of T3, T4, BMI, an increase in TSH level, and improvement in quality of life were reported in a single study.[22] However, the distribution of subjects between hypothyroidism and hyperthyroidism was not clear. The population was not homogeneous at the baseline. Hence, the results are not clear.

Thyrotoxicosis

Results were not conclusive in the case of thyrotoxicosis as reported in the only study.[24]

Discussion

The qualitative analysis reveals that most results are seen in hypothyroidism, female patients, and the age group 18–50 years. Studies were focused on balancing thyroid hormones, TSH, and psychological variables such as anxiety, stress, depression, and quality of life through Yoga intervention. Seven studies[17,20,21,23,25,27,28] reported an improvement in T3, T4, and TSH levels in hypothyroid patients. However, only two RCTs were available to measure the effect of Yoga. Hence, more RCTs are needed to generate robust evidence. A systematic review[30] done by Baishya and Metri in 2024[30] also revealed the same

Table 2: Summary of the studies

Author, year	Yoga components	Outcome parameters	Tools and measurement	Study design	Population	Duration	Result	Conclusion
Nilakanthan G. M. *et al.*, 2016[17]	Sukshma Vyayama Suryanamaskar DRT Asanas Pranayama and kriyas	TL TR HDL LDL TSH Thyroxine	Blood test for lipid profile (TL, TR, HDL, LDL), and TSH	Single group pre–post pilot	Household women with 3–5 year history of hypothyroidism Total=22 Age=30–40 years	Total 6 months 1 h/day 4 days/week	Significant reduction in TL: $P<0.001$, LDL: $P=0.002$, TR: $P<0.001$, and thyroxine dose at $P<0.05$ significant increase in HDL: $P<0.05$, and reduction in TSH: $P=0.452$	Yoga helped in balancing lipid profile, however, close to significant reduction in TSH Thyroxine medication dose reduced in 7 out of 22 subjects
Singh *et al.*, 2011[18]	Loosening exercise, Asanas, Pranayama, Bandha	QoL	WHOQOL-BREF	Single group pre–post	Hypothyroid female patients Total=20 Age=35–55 years	Total 1 month daily 1 h	Significant increase in overall QoL, Overall perception of health, physical health, psychological, social relationship, environmental domain at $P<0.01$	Yoga improved in QoL in female hypothyroid patient
Gupta *et al.*, 2006[19]	Loosening exercises, Asanas, Pranayama (breathing practices), Meditation	Anxiety	STAI	Experimental controlled study	Total=225 (124 males and 101 females) patients with thyroid disorders=8 only Group 1=175 Group 2=50 Age=19–76 years	Total 10 days 3–4 h/day	Significant reduction in anxiety scores in intervention group at $P<0.001$ however no change in anxiety levels of thyroid patients	10 days Yoga practice reduced anxiety in different patients but was not enough for thyroid patient
Rani *et al.*, 2021[20]	Loosening, Suryanamaskar, Asana breathing practices, pranayama meditation	Anxiety, depression, and stress, fasting lipid profiles and sTSH, levels, fatigue	DASS-21, blood test immunometric assays of thyrotropin (for TSH), the fatigue severity scale	Single arm pre–post design	Total=38 hypothyroidism women Age=20–50 years	Total 3 months 1 h/day 5 days/week	Significant reduction in stress, anxiety, depression, fatigue, sTSH, LDL, triglyceride, total cholesterol at $P<0.01$	3 months' Yoga practice improved psychological and balanced biochemical parameters of hypothyroid patients
Nanduri *et al.*, 2020[21]	YPV: Breathing, Asana, meditation, diet	TSH Body pain, depression	Blood test	A case report	Case: 1 49-year-old female, suffering from hypothyroid Case: 2 59-year-old male had been suffering from hypothyroid	Total 1 month	Case: 1 Pre-YPV: Post-YPV: TSH value of 0.987 uIU/mL Case: 2 Pre-YPV: TSH 12.054 uIU/mL Post-YPV: TSH level was 3.477 uIU/mL	1 month Yoga practice reduced depression, body pain and TSH level of hypothyroidism patients

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Table 2: Contd...

Author, year	Yoga components	Outcome parameters	Tools and measurement	Study design	Population	Duration	Result	Conclusion
Mishra *et al.*, 2019[22]	Kapalabhati, Ujjayi Pranayama, Sarvangasana, and Halasana OM chanting	T3, T4, TSH, BMI and QoL	Blood test, WHOQOL	Experimental controlled study	90 male and female (aged 38±5 years) thyroid (hyper and Hypothyroidism) patients Yoga group=45 Om chanting group=45	Total 12 weeks 1 h/day 6 days/week	Significant reduction in T3, T4, and BMI at $P<0.001$ and an increase in TSH at $P<0.001$ of Yoga group No significant change in the CG	Yoga improved QoL and balanced the thyroid hormones in thyroid patients
Balayogi *et al.*, 2011[23]	Suryanamaskar, Asana, Pranayama, Mudra Bandh and Relaxation	TSH, FT4, anti TPO	Blood test	A case report	A 36-year-old female, suffering from subclinical hypothyroidism	Total 6 month	TSH reduced from 9.39 IU/mL to 2.66 mIU/L, FT4 value from 12.57 pmol/L to 8.98 pmol/L Anti-TPO antibodies were positive both before and after the Yoga	6 months of Yoga practice helped in balancing the levels of thyroid hormones in subclinical hypothyroidism
Singh *et al.*, 1988[24]	SP	Constipation, abdominal pain, loss of appetite, vomiting tendency, diarrhea in irritable bowel syndrome, anxiety neuroses, blood urea level in chronic renal failure patients thyrotoxicosis	Not mentioned	Case series	Total=69 Irritable bowel syndrome: 27 cases Anxiety neuroses: 17 cases Chronic renal failure: 8 cases Thyrotoxicosis: 5 cases Healthy people=12	Total session of SP in Irritable bowel syndrome: Within an interval of 5 days and then 4 within an interval of 7 days Anxiety Neuroses: Not mentioned Chronic renal failure: Within an interval of 10 days, 5 sessions Thyrotoxicosis: Not mentioned	Irritable bowel syndrome: Encouraging Anxiety neuroses: Satisfactory Chronic renal failure: Encouraging in early cases only Thyrotoxicosis: Yet to establish	Results not conclusive in case of thyrotoxicosis
Swami *et al.*, 2010[25]	Pranayama, Meditation	TSH, pulmonary function: FEV1, FVC, FEV/FVC, PEFR, PEF, MVV and IC	TSH by standard kit Pulmonary functions by Hypair compact (version 1.28) medisoft S.A Belgium	Experimental controlled study	Total=40 Group 1=20 hypothyroid females Group 2=20 healthy volunteers Age=39.70±8.27 years	Total 6 months 45 min everyday	Decline in TSH and significant improvement in pulmonary functions within Yoga group; MVV (P=0.001), IC (P=0.000) PEFR (P=0.007) PEF (P=0.002)	Pranayama and meditation can improve Pulmonary Functions in hypothyroid patients along with conventional treatment

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Table 2: Contd...

Author, year	Yoga components	Outcome parameters	Tools and measurement	Study design	Population	Duration	Result	Conclusion
Kamatchi Scholar and Professor 2022[26]	Loosening the joints Surya Namaskar Asanas Pranayama Bandhas and mudras Yoga Nidra	TR and self-esteem	Not mentioned	Experimental controlled study	Women suffering from hypothyroidism Total - 30 Group A (experimental group)=15 Group B (CG)=15 Age=45–55 years	Total 8 weeks 60 min/day 6 days/week	Significant decline in TR and improvement in self-esteem of Yoga group at $P<0.05$ level	yogic practices can decrease TR and improve self-esteem of women suffering from hypothyroidism
Sharma Chairman 2016[27]	Asana, Pranayama, Bandha Yoga nidra	T3, T4, TSH	Blood test	Experimental controlled study	Total=20 hypothyroid patients Group 1=10 (Yoga group) Group 2=10 (CG) Age=18–60 years	Total 3 months 1 h/day	Significant increase in T3 and T4 at $P<0.05$ while significant decrease in TSH at $P<0.05$	Yogic practices can balance the thyroid hormones of hypothyroid patients
Ranjna *et al.*, 2019[28]	OM chanting, Loosening exercises, asana, bandha, pranayama, kriya	fT3, fT4, TSH, Anti-TPO, FBS, cholesterol	Blood test	Prospective RCT	Total=83 hypothyroidism patients Group 1=42 (Yoga group) Group 2=41 (CG) Age=21–65 years	Total 6 months 45 min First 2 months 3 days/week Next 4 months 2 days/week	Significant increase in fT4 levels ($P=0.001$ for control and $P=0.004$ for Yoga group) Significant decrease in TSH levels ($P=0.000$ for both the group) Anti-TPO levels ($P=0.002$ and $P=0.02$ for control and Yoga group respectively) FBS level (Yoga group $P=0.04$), cholesterol level (Yoga group $P=0.000$)	Yoga helps in the management of thyroid function tests, and biochemical parameters
Chintala *et al.*, 2019[29]	Loosening procedures, Pranayama, Asana	Short-term HRV	ECG	RCT	Total=50 hypothyroidism patients Group 1=25 PG Group 2=25 CG Age=18–30 years	Total 1 month 3 days/week for 28 min	Yoga group significantly increased RMSSD and HF nu at $P<0.05$ and $P<0.001$ while decline in mean RR at $P<0.05$, Total power at $P<0.01$, LF nu and LF/HF<0.001	Pranayama in addition to standard medical therapy is more beneficial to improve cardiovascular autonomic function in hypothyroid patients

TL: Total cholesterol, TR: Triglycerides, HDL: High-density lipoprotein, LDL: Low density lipoprotein, TSH: Thyroid stimulating hormone, QoL: Quality of life, WHOQOL-BREF: WHO QoL Scale-brief version, STAI: State Trait Anxiety Inventory, DASS-21: Depression, Anxiety, and Stress Scale, sTSH: Serum TSH, YPV: Yoga Prana Vidya, T3: Triiodothyronine, T4: Thyroxine, BMI: Body mass index, FT4: Free thyroxine, Anti-TPO: Antithyroid peroxidase, SP: Shankhaprakshalana, FEV_1: Forced expiratory volume in 1st s, FEV: Forced expiratory volume, MVV: Maximum voluntary ventilation, IC: Inspiratory capacity FVC: Forced vital capacity, PEFR: Peak expiratory flow rate, PEF: Peak expiratory flow, fT3: Free triiodothyronine, FBS: Fasting blood sugar, ECG: Electrocardiogram, RMSSD: Root mean square of successive differences, HF: High frequency, RR: RR interval, LF: Low frequency, PG: Pranayama group, CG: Control group, HRV: Heart rate variability, RCT: Randomized control trial, DRT: Deep relaxation techniques

findings of few available RCTs measuring the effect of Yoga on hypothyroidism. Still, the studies found a positive change in managing the symptoms of thyroid patients. These results are aligned with other studies that could not be included in the review as they did not satisfy the inclusion and exclusion criteria.[31-34] In the case of psychological variables, two studies[19,20] showed a reduction in anxiety, stress, and depression, and two studies[18,22] showed improvement in the quality of life of thyroid patients after a Yoga intervention. The results were again similar to other nonreviewed studies.[35-38]

It has been seen that autoimmune TDs (AITD) such as Grave's disease and Hashimoto's thyroiditis are the main causes of developing hyperthyroidism and hypothyroidism, respectively.[10,11] Stress, immune dysregulation, reduced gut microbiota diversity, and genetic predisposition may contribute to AITD.[39-42] Researches are indicating that Yoga can reduce these factors which may help to manage the symptoms of TD. A systematic review[43] concluded that Yoga is a promising practice to reduce stress, based on reduction in the various biosignals such as galvanic skin response, muscle tension, heart rate, and increased heart rate variability which indicated a stress reduction.

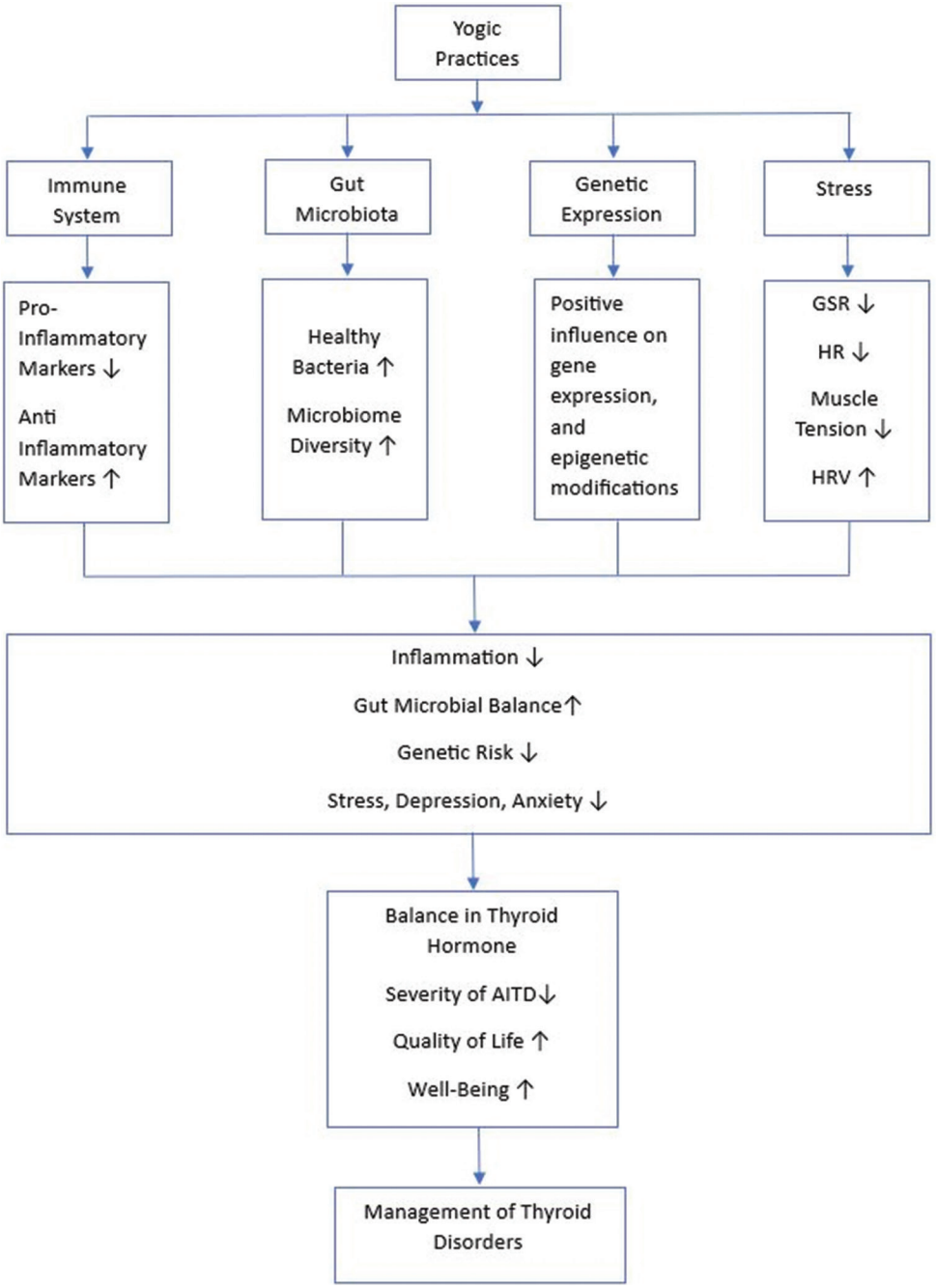

Figure 3: Potential mechanism of management of thyroid diseases through Yoga

Inflammation, a component of immune imbalance, is also seen to contribute in AITDs.[44] A systematic review of RCTs revealed that Yoga increases the anti-inflammatory markers such as transforming growth factor beta (TGF-β), Human leukocyte antigen-G (HLA-G), and peroxisome proliferator-activated receptor-γ (PPAR-γ) and decreases pro-inflammatory markers – interleukin (IL)-1α, IL-2, IL-17A, and cytotoxic T lymphocyte-associated antigen-4 (CTLA-4), ultimately reducing the inflammation and balancing the immune system.[45] The effect of Yoga on particular inflammatory markers involved in corresponding TD may be explored further. Moreover, gut microbiome composition and diversity differ in different TD and may be linked with thyroid peroxidase antibodies.[46] Yoga may also alter gut diversity and composition. Significant higher bacteria such as prevotella, bacteroides, megamonas, and fecalibacterium were found in the experienced meditation practitioners[47] indicating Yoga's potential beneficial role. Furthermore, long-term exposure to a vegan diet and meditation enriched the gut with bifidobacterium, roseburia, and subdoligranulum microbiome which were associated with enhanced immunity and adjusting metabolic levels.[48] Another factor – genetic predisposition is also linked with AITDs which may be positively influenced by Yoga to manage TD.[49,50] Based on the discussion, a potential mechanistic model has been developed in Figure 3.

However, there has been limited research on Yoga for autoimmune thyroid disorders like Hashimoto's thyroiditis and Graves' disease. For instance, a case report in 2019[51] focused on Graves' disease where Yoga was a lifestyle intervention involving dietary change, daily physical exercise, meditation sessions, and some natural supplements helped to bring free triiodothyronine (FT3) and free Thyroxine (FT4) back to normal limits, and TSH receptor antibodies (TRAb) were also found negative. A study done by Banerjee in 2019[52] revealed that diet in conjunction with Yoga intervention reduced the BMI and severity of hypothyroidism in female patients. A study by Mehta and Parwe, 2021[53] showed improvement in the general well-being of patients with hypothyroidism. Most of the studies aimed at managing the symptoms of hypothyroidism through Yoga interventions. Few studies were lacking in properly reporting the description of the intervention and variables. Further, RCTs are also very limited. Hence, the authors could observe consistent positive effects of Yoga in hypothyroidism only.

Conclusion

Yoga helped to balance the thyroid hormones and other biochemical parameters such as TSH, TL, TR, and LDL toward the normal limits. Psychological parameters of thyroid patients, such as the overall quality of life, stress, anxiety, and depression, were also managed through yogic practices. The overall direction of the experimental studies shows that Yoga may help to manage the symptoms of TD with most evidence on hypothyroidism. However, more randomized controlled studies with larger sample sizes are much needed to generalize the findings, especially on hyperthyroidism and AITDs.

Future recommendations

- Randomized controlled Studies with larger sample sizes may be done
- Studies on hyperthyroidism and AITDs are lacking which can be conducted further.

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Conflicts of interest

There are no conflicts of interest.

References

1. Unnikrishnan AG, Menon UV. Thyroid disorders in India: An epidemiological perspective. Indian J Endocrinol Metab 2011;15:S78-81.
2. Shahid M, Ashraf MA, Sharma S. Physiology, thyroid hormone. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023.
3. Veronelli A, Mauri C, Zecchini B, Peca MG, Turri O, Valitutti MT, *et al.* Sexual dysfunction is frequent in premenopausal women with diabetes, obesity, and hypothyroidism, and correlates with markers of increased cardiovascular risk. A preliminary report. J Sex Med 2009;6:1561-8.
4. van den Boogaard E, Vissenberg R, Land JA, van Wely M, van der Post JA, Goddijn M, *et al.* Significance of (sub) clinical thyroid dysfunction and thyroid autoimmunity before conception and in early pregnancy: A systematic review. Hum Reprod Update 2011;17:605-19.
5. Gabrielson AT, Sartor RA, Hellstrom WJ. The impact of thyroid disease on sexual dysfunction in men and women. Sex Med Rev 2019;7:57-70.
6. Ning Y, Cheng YJ, Liu LJ, Sara JD, Cao ZY, Zheng WP, *et al.* What is the association of hypothyroidism with risks of cardiovascular events and mortality? A meta-analysis of 55 cohort studies involving 1,898,314 participants. BMC Med 2017;15:21.
7. Sohn SY, Lee E, Lee MK, Lee JH. The association of overt and subclinical hyperthyroidism with the risk of cardiovascular events and cardiovascular mortality: Meta-analysis and systematic review of cohort studies. Endocrinol Metab (Seoul) 2020;35:786-800.
8. Lekurwale V, Acharya S, Shukla S, Kumar S. Neuropsychiatric manifestations of thyroid diseases. Cureus 2023;15:e33987.
9. Nexo MA, Watt T, Pedersen J, Bonnema SJ, Hegedüs L, Rasmussen AK, *et al.* Increased risk of long-term sickness absence, lower rate of return to work, and higher risk of unemployment and disability pensioning for thyroid patients: A Danish register-based cohort study. J Clin Endocrinol Metab 2014;99:3184-92.
10. Gessl A, Lemmens-Gruber R, Kautzky-Willer A. Thyroid disorders. Handb Exp Pharmacol 2012;214:361-86.
11. De Leo S, Lee SY, Braverman LE. Hyperthyroidism. Lancet 2016;388:906-18.

12. Liu F, Zhang X. Hypertension and obesity: Risk factors for thyroid disease. Front Endocrinol (Lausanne) 2022;13:939367.
13. Fang T, Lin L, Ou Q, Lin L, Zhang H, Chen K, *et al.* An investigation on the risk factors of thyroid diseases in community population in Hainan. Int J Endocrinol 2022;2022:4514538.
14. Alyahya A, AlNaim A, AlBahr AW, Almansour F, Elshebiny A. Knowledge of thyroid disease manifestations and risk factors among residents of the Eastern province, Saudi Arabia. Cureus 2021;13:e13035.
15. Grigoriadis G, Koufakis T, Kotsa K. Epidemiological, pathophysiological, and clinical considerations on the interplay between thyroid disorders and type 2 diabetes mellitus. Medicina (Kaunas) 2023;59:2013.
16. Sara Rosenthal M. The Thyroid Sourcebook. 5th ed. McGraw Hill: America; 2008.
17. Nilakanthan S, Metri K, Raghuram N, Hongasandra N. Effect of 6 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;13:189-93.
18. Singh P, Singh B, Dave R, Udainiya R. The impact of yoga upon female patients suffering from hypothyroidism. Complement Ther Clin Pract 2011;17:132-4.
19. Gupta N, Khera S, Vempati RP, Sharma R, Bijlani RL. Effect of yoga based lifestyle intervention on state and trait anxiety. Indian J Physiol Pharmacol 2006;50:41-7.
20. Rani S, Maharana S, Metri KG, Bhargav H, Nagaratna R. Effect of yoga on depression in hypothyroidism: A pilot study. J Tradit Complement Med 2021;11:375-80.
21. Nanduri VS, Revathi R, Janani N. Successful healing treatment of hypothyroidism using integrated Yoga Prana Vidya (YPV) healing approach as complementary medicine: Case reports. J Prev Med Holist Health 2020;6:42-8.
22. Mishra A, Gowda P, Mishra A, Gowda P. Impact of yoga on patients suffering with hyper and hypothyroidism. Int J Physiol 2019;4:543-5. Available from: https://www.journalofsports.com. [Last accessed on 2023 Oct 01].
23. Balayogi A, Sri B, Vidyapeeth B, Sanjay Z. Effect of Yoga on Subclinical Hypothyroidism: A Case Report; 2011. Available from: https://www.kdham.com. [Last accessed on 2023 Oct 01].
24. Singh SN, Jaiswal V, Maurya SP. "Shankha Prakshalana" (gastrointestinal lavage) in health and disease. Anc Sci Life 1988;7:157-63.
25. Swami G, Singh S, Singh KP, Gupta M. Effect of yoga on pulmonary function tests of hypothyroid patients. Indian J Physiol Pharmacol 2010;54:51-6.
26. Kamatchi C, Elangovan R. Effect of yogic practices on triglycerides and Self Esteem among middle aged women suffering with hypothyroidism. Journal of Education 24:64-70.
27. Sharma K, Mahabala P, Treatment of Hypothyroidism through yoga therapy – A study. Global Journal For Research Analysis 2016;5:37-9.
28. Ranjna C, Rukamani N, Somnath M, Yendrenbam Ibotombi M, Sood VR. Effect of Yoga on Thyroid Function Tests and Biochemical Parameters in Patients Suffering From Hypothyroidism. International Journal of Applied Ayurved Research. Available from: https://www.ijaar.in. [Last accessed on 2024 Nov 06].
29. Chintala KK, Samudrala V, Krishna BH. Effect of short term pranayama on cardiovascular autonomic function in hypothyroidism. Int J Physiol 2019;7:35.
30. Baishya A, Metri K. Effects of yoga on hypothyroidism: A systematic review. J Ayurveda Integr Med 2024;15:100891.
31. Chatterjee S, Mondal S. Effect of Combined Yoga Programme on Blood Levels of Thyroid Hormones: A Quasi-Experimental Study; 2017. Available from: https://www.researchgate.net/publication/340731341. [Last accessed on 2024 Jun 23].
32. Nirwan M, Jyothish KJ, Halder K, Chakraborty S, Saha M, Pathak A, *et al.* Yoga intervention as a potential countermeasure for polar T3 syndrome. Def Life Sci J 2019;4:163-9.
33. Chaturvedi A. Efficacy of yoga in balancing the deranged biochemical profile in healthy perimenopausal women hailing from South Kanara district of Karnataka, India. Asian J Biomed Pharm Sci 2015;5:20-5.
34. Rani M, Singh U, Agrawal GG, Natu SM, Kala S, Ghildiyal A, *et al.* Impact of yoga nidra on menstrual abnormalities in females of reproductive age. J Altern Complement Med 2013;19:925-9.
35. Shohani M, Badfar G, Nasirkandy MP, Kaikhavani S, Rahmati S, Modmeli Y, *et al.* The effect of yoga on stress, anxiety, and depression in women. Int J Prev Med 2018;9:21.
36. Chauhan S, Babu AM, Galgalo DA, Melczer C, Prémusz V, Karsai I. Effect of yoga in medical students to reduce the level of depression, anxiety, and stress: Pilot study (Goodbye Stress with Yoga GSY). BMC Complement Med Ther 2024;24:203.
37. Tawari PR, Sheetal Bamhane D. Effectiveness of Power Yoga on Anxiety and Quality of Life in Young Females with Polycystic Ovarian Syndrome (Pcos)-an Experimental Study. Vol. 11; 2023. Available from: https://www.ijcrt.org. [Last accessed on 2024 Jun 24].
38. Akhter J. Role of yoga in improving quality of life of hypothyroidism patients. Int J Adv Med 2019;6:341.
39. Bagnasco M, Bossert I, Pesce G. Stress and autoimmune thyroid diseases. Neuroimmunomodulation 2006;13:309-17.
40. Bogusławska J, Godlewska M, Gajda E, Piekiełko-Witkowska A. Cellular and molecular basis of thyroid autoimmunity. Eur Thyroid J 2022;11:e210024.
41. Gong B, Wang C, Meng F, Wang H, Song B, Yang Y, *et al.* Association between gut microbiota and autoimmune thyroid disease: A systematic review and meta-analysis. Front Endocrinol (Lausanne) 2021;12:774362.
42. Panicker V. Genetics of thyroid function and disease. Clin Biochem Rev 2011;32:165-75.
43. Khajuria A, Kumar A, Joshi D, Kumaran SS. Reducing stress with yoga: A systematic review based on multimodal biosignals. Int J Yoga 2023;16:156-70.
44. Stensland ZC, Coleman BM, Rihanek M, Baxter RM, Gottlieb PA, Hsieh EW, *et al.* Peripheral immunophenotyping of AITD subjects reveals alterations in immune cells in pediatric versus adult-onset AITD. iScience 2022;25:103626.
45. Yeun YR, Kim SD. Effects of yoga on immune function: A systematic review of randomized controlled trials. Complement Ther Clin Pract 2021;44:101446.
46. Alkader DA, Asadi N, Solangi U, Singh R, Rasuli SF, Farooq MJ, *et al.* Exploring the role of gut microbiota in autoimmune thyroid disorders: A systematic review and meta-analysis. Front Endocrinol (Lausanne) 2023;14:1238146.
47. Sun Y, Ju P, Xue T, Ali U, Cui D, Chen J. Alteration of faecal microbiota balance related to long-term deep meditation. Gen Psychiatr 2023;36:e100893.
48. Jia W, Zhen J, Liu A, Yuan J, Wu X, Zhao P, *et al.* Long-term vegan meditation improved human gut microbiota. Evid Based Complement Alternat Med 2020;2020:9517897.
49. Saatcioglu F. Regulation of gene expression by yoga, meditation and related practices: A review of recent studies. Asian J Psychiatr 2013;6:74-7.

50. Giridharan S. Beyond the mat: Exploring the potential clinical benefits of yoga on epigenetics and gene expression: A narrative review of the current scientific evidence. Int J Yoga 2023;16:64-71.
51. Brogan K, Marcelino G, Pedro C, Siefert A. Healing of graves' disease thorough lifestyle changes: A case report. Adv Mind Body Med 2019;33:4-11.
52. Banerjee S. Study on yoga intervention along with diet on hypothyroidism associated with obesity among sedentary working women in West Bengal. Int J Yoga Allied Sci 2019;8:18-23.
53. Mehta A, Parwe S. Evaluation of Vamana and Virechana karma in the treatment of hypothyroidism – A study protocol. J Pharm Res Int 2021;33:161-9.