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Ujjayi pranayama in hypothyroidism: A scoping review

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Abstract
Background: The demand for clinically efficacious, safe, patient acceptable, and cost-effective forms of treatment for hypothyroid is growing. Several studies have demonstrated benefit from ujjayi pranayama in treating hypothyroidism.
Objective: The objective of this study was to critically evaluate the evidence for the effectiveness of ujjayi pranayama in management of hypothyroidism.
Design: An exhaustive systematic research was conducted. Databases searched were PubMed, Cochrane Library, MEDLINE®, CINAHL Plus with full text, Google Scholar, World wide science and Social Science Research Network.
Results: The search yielded 9 full text articles (n=9). These were retrieved and screened. The important findings suggest effectiveness of Ujjayi pranayama practice in treating hypothyroidism.
Conclusion: Ujjayi pranayama contributes in lowering BMI, lipid indices, depression, TSH, T_3, T_4 levels and helps in improving respiratory functions. There is dearth in literature to support the effects of ujjayi pranayama on hypothyroid patients though ancient texts support the view strongly.

Keywords: hypothyroidism, ujjayi pranayam, thyroid stimulating hormone, basal metabolic rate

Introduction
Hypothyroidism is quite possibly the most well-known wellbeing conditions described by hypo-working of the thyroid organ [1]. It is accepted to be a typical medical problem in India and around the world. The commonness of hypothyroidism is very high, influencing around one out of 10 out of 35 grown-ups [2]. It is more common in females and senior populace [3]. Hypothyroidism is described by expanded level of thyroid incitement chemical (TSH) [4], fatty substances, low-thickness lipoprotein (LDL) and diminished high-thickness lipoprotein (HDL). Subsequently hypothyroidism is related with expanded danger of atherosclerosis [5]. The executives of dyslipidemia, TSH level and thyroxine measurements is the objective of regular administration of hypothyroidism in request to lessen the entanglements and comorbidities. Studies revealed that thyroid chemical treatment leads to a diminishing in bone mineral thickness, which may prompt expanded odds of breaks [6]. This can likewise cause spinal osteopenia [7]. Yoga is quite possibly the most old sciences, which was rehearsed by old Indians for the higher purposes like self-acknowledgment Samadhi and acquiring the higher powercalled siddhis. Numerous logical examinations have been conducted on various segments of yoga like asana (yogic actual stances), pranayama (yogic relaxing rehearses), contemplation and yoga-based unwinding techniques since most recent couple of many years. Studies announced wellbeing benefitting impacts of yoga in numerous infected conditions like diabetes, hypertension, asthma [8], melancholy, tension [9] and so forth Past examinations on yoga announced that yoga helps in decreasing the weight record (BMI), complete cholesterol what's sans more fat mass in hefty people [10]; it too decreases the fatty substances and improves HDL and in general prosperity. Henceforth, it has an expected part as extra to the cutting edge clinical administration of hypothyroidism

Ujjayi Pranayam: Ujjayi Prananaya soothes the mind and induces a meditative state. Ujjayi means to lift up. In Ujjayi Pranayama, the chest is slightly lifted up as if the inhalation is done from the throat. Ujjayi Pranayama is mentioned in the yoga text Hatha Yoga Pradeepika and in the Gheranda Samhita.

Ujjayi involves a deep inhalation from both nostrils with a half closed glottis, so that a faint hissing snoring sound is made during the inhalation. Then there is retention of breath followed by exhalation. Those suffering from heart ailments and blood pressure problems should avoid Kumbhaka or retention of breath. This practice should be learnt from a qualified Yoga instructor.

Method of Ujjayi Pranayama

- Sit in any meditative pose like Padmasana (Lotus pose) with eye closed and try to keep your spine erect.
- Take a long, deep breath slowly from both the nostril (inhale or breath in).
- While breath in trying to contract the throat and feel the touch of air in your throat.
- Remember one thing air should not touch inside the nose
- As air touches the throat a peculiar sound is produced.
- Enable the breath to be light and relaxed as you slightly contract the rear of your throat, making a gentle hissing sound as you inhale and out. The sound isn't forced; however, it ought to be loud enough so if somebody came near you they'd hear it.
- Now breathe out by closing your right nostril and exhale from the left nostril. Try to produce the sound HHHHHAAAA while exhaling.

There is one another technique for Ujjayi Pranayama. In the third technique apply Bandhas with breath-holding. First of all attempt Ujjayi Pranayama in a simple way then try with Kumbhaka and at last if you are master in doing Ujjayi with Kumbhaka then go for Bandhas in Ujjayi Pranayama.

Best Time for doing Ujjayi Pranayama

- Early in the morning or evening time.
- Before doing meditation.
- Do Ujjayi Pranayama for 3 to 5 times.

Effects of Ujjayi Pranayam

In 2009, RCT was published in Indian Journal of Physiology Pharmacology [12], to see the effects on respiratory functions in hypothyroid patients after pranayama. Control group was given study drug and treatment group included hypothyroid females (n=20). For 21 days subjects received treatment in yoga lab after which every 7 days later follow up was done. Breathing exercises done for 45 minutes everyday. Baseline and 6 months later measurements were taken. FEV_1 (forced expiratory volume in 1st second), FVC, FEV_1/FVC, PEFR, MVV (maximum voluntary ventilation), IC (inspiratory capacity) were taken as outcome variables. Spirometric recordings with hypair compact (version 1.28) medisoft SA Belgium were taken. 6 months treatment included meditation, 45 minutes of pranayama which included kapalbati, bhastrika, bhramari, ujjayi and anulom vilom. 6 minutes of relaxation as shavasanas including supine posture with eyes closed, OM chanting, awareness and deep relaxation techniques of different parts of body. Ujjayi pranayama did play a role in improving these lung volumes and capacities [12].

In 2010, The study, effect of ujjayi and bhastrika pranayama on selected physiological variables of physically challenged students was published to analyse the effect of Ujjayi and Bhastrika Pranayama on selected physiological variables [13]. For this 60 physically challenged male students were randomly selected as the subjects from Amar Jyoti School and Roshni Rehabilitation Centre, Gwalior. Further the subjects were divided into two groups that is, experimental group and control group. The experimental group followed of Ujjayi and Bhastrika Pranayama for a period of 6 weeks. The training was given for 5 days in a week in the morning. Only four physiological variables that is, vital capacity, positive breath holding time, resting pulse rate and blood pressure were selected for the study. Pre- and post-test data on selected physiological variables were recorded prior to and after completion of 6 weeks pranayama training of experimental group, and the control group did not participate in the training programme. The criterion measures for measuring vital capacity was measured with Recorder and Medicare
Systems Spirometer (Helios 401) in litres, positive breath holding and resting pulse rate was measured with the help of stopwatch, and blood pressure was measured by sphygmomanometer and stethoscope. Paired 't' test statistical technique was employed to analyse the raw data, and the mean difference between the pretest and post-test scores each of the criterion variables of the groups. The level of significance was chosen at 0.05 level. From the findings it was observed that 't' ratio was not significant incase of resting pulse rate and diastolic blood pressure. However in case of vital capacity and positive breath {holding time 't' was significant [13].

In 2011, published in Complementary therapies in clinical practice was a study analysing effect of yoga on quality of life of female hypothyroid patients. The WHO Quality of Life Scale [11] was used to assess the quality of life of 20 female hypothyroid patients. Subjects attended one hour yoga sessions daily for a period of one month. A pretest–post-test research design was used for data analysis. Yoga was considered as supportive or complementary therapy in conjunction with medical therapy for the treatment of hypothyroid disorder [14].

In 2012, in the Journal of clinical and diagnostic research, the effect of the non-conventional yogic intervention, ujjayi pranayama and shavasana in modulating the cardiovascular functions, were assessed in 60 healthy male adults [15]. Subjects were divided into two groups of 30 each (Group I and GroupII). Group I was given training in ujjayi pranayama and shavasana. Ujjayi pranayama is a slow deep inspiration followed by slow deep expiration, with breath holding in between. Shavasana- the patients lie supine, with all the muscles being totally relaxed Group II served the control group and the results which were obtained was analyzed statistically. Ujjayi pranayama and shavasana produced a significant decrease in the HR, SP, DP, PP, MAP and RPP after 6 weeks of yoga training. A short term pranayama practice for six weeks improved the para-sympathetic (vagal) functions which suppressed the sympathetic activity, thus denoting the para-sympathetic dominance on the cardiovascular system. This breathing exercise can also relieve stress, and it can also be practiced by hypertensive patients as a complimentary therapy with drug therapy [15].

In 2013, Hindawi published a within participant design in Evidence based complementary and alternative Medicine. Slow breathing has proved to increase cardiac-vagal baroreflex sensitivity (BRS), improve oxygen saturation, lower blood pressure, and reduce anxiety. Within the yoga tradition slow breathing is often paired with a contraction of the glottis muscles. This resistance breath "ujjayi" is performed at various rates and ratios of inspiration/expiration. The study tested whether ujjayi had additional positive effects to slow breathing, comparison was made between BRS and ventilatory control under different breathing patterns (equal/unequal inspiration/expiration at 6 breath/min,

with/without ujjayi), in 17 yoga-naive young healthy participants. BRS increased with slow breathing techniques with or without expiratory ujjayi (P<0.05 or higher) except with inspiratory + expiratory ujjayi. The maximal increase in BRS and decrease in blood pressure were found in slow breathing with equal inspiration and expiration. This corresponded with a significant improvement in oxygen saturation without increase in heart rate and ventilation. Ujjayi showed similar increase in oxygen saturation but slightly lesser improvement in baroreflex sensitivity with no change in blood pressure. The slow breathing with equal inspiration and expiration seemed the best technique for improving baroreflex sensitivity in yoga-naive subjects according to this study.

In 2016, in Journal of complementary and integrative medicine, effect of 6 months intense yoga practice on lipid profile, thyroxine medication and serum TSH level in women suffering from hypothyroidism: a pilot study was published[16]. Twenty-two household women suffering from hypothyroidism between the age range of 30 and 40 years, with average 4 ± 1.12-year history of hypothyroidism were included in this study. All the subjects underwent 6 months of yoga practice 1 h daily for 4 days a week. Lipid profile, thyroxine dosage and serum TSH level were assessed before and after intervention. Data was analysed using paired sample t test & Wilcoxon's signed rank test. Physical postures, Suryanamaskar, and dynamic yogic breathing practices like Bhastrika and Kapalabhati pranayama helped in increasing the physical activity and metabolic rate, and slow breathing practices like Nadi Shuddhi pranayama, Ujjayi pranayama and Bhramari pranayama helped in the enhancement of physical and mental relaxation. There was significant reduction in total cholesterol, LDLs (low density lipoproteins), triglycerides and significant improvement in HDLs (high density lipoproteins) [16].

In 2019, study published in Journal Results of the pre and post measurements on T3, T4, TSH, Body weight and BMI among Ujjai pranayama along with standard drug group for a period of 90 days shows that Body weight was reduced and T3 got raised statistically significant after the yoga intervention where as T4 doesn't show's any statistical significance after the yoga intervention. Even though in yoga intervention group T4 doesn't show statistical significance its mean value raised to a marked level from 8.05 to 8.54 mg/dl. This shows that ujjai pranayama is influencing the T4 secretion. TSH level reduced significantly after the practice of ujjai pranayama for a period of 90 days [17].

In 2020, in world journal of pharmaceutical and medical research, study was published to determine the effect of practicing Ujjayi Pranayama on Hypothyroidism in Adults[18]. Ujjayi involves a deep inhalation from both nostrils with a half closed glottis, so that a faint hissing snoring sound is made during the inhalation. Then there is retention of breath followed by exhalation. Ujjayi Pranayama is mentioned in the yoga text Hatha Yoga Pradeepika and in the Gheranda Samhita. It was concluded that pranayama for hypothyroidism is one of the most recommended breathing exercises to relieve the symptoms of the condition and yoga is valuable in helping the hypothyroidism patient to manage their hypothyroid related symptoms [18].

In 2021, According to article published in Journal of clinical and diagnostic research, integrated yoga module was designed for hypothyroidism patients based on traditional yoga literature and expert opinion [19]. 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 assertain 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. Out of the 53 techniques, 41 techniques scored either CVR (content validity ratio) more than 0.5 or average of mean, median and mode more than 4. The developed integrated yoga module for hypothyroidism has good face and content validity. Feasibility test confirmed 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. 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 [19].

Conclusion

Current review concluded that ujjayi pranayam is effective in decreasing hypothyroidism but there is a paucity of evidence related to it. Thus, there is need to enhance literature with more experimental studies.

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