



The effect of fitness training and nutritional psychological counseling on tension, depression, t3, t4 and TSH in middle Aged ladies with hypothyroidism

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Abstract

Objectives: TSH becomes elevated despite the fact that the T4 and T3 should still be at intervals the normal vary. TSH is adequate to stay the conventional endocrine gland functioning properly. This aim of the study was to evaluate the effect of 8 weeks of fitness training and nutritional psychological counseling on the tension, depression, T3, T4 and TSH in middle aged ladies with hypothyroidism.

Materials and Methods: To fulfill the aim of the study, completely 65 hypothyroid middle aged ladies subjects were willing to participate, however the investigator has chosen solely 45 subjects who were enough to undergo the experimental training, they were hand-picked from the organization of Thyroid Care Centers, Coimbatore, Tamil Nadu, India. They were clinically and bio-chemicals confirmed, cases of hypothyroid disease and their age ranged between forty and fifty years. The subjects with other complications of thyroidism were excluded. Solely the thyroid disease subjects were willing to participate within the experimental study were enclosed during this study. The study was developed as a real cluster style consisting of pretest and post test. The subjects (N=15) were randomly assigned to three equal groups of fifteen among middle aged women with hypothyroidism- the experimental group I, experimental group II and control group respectively. Pre test was conducted for all the 45 subjects on selected health related fitness and psychology and biochemical variables. Blood samples were collected after 8 weeks training first in order to evaluate tension, depression, T3, T4, and TSH the pretest and post test scores were subjected to apply statistically analysis of variance (ANCOVA) to seek out the importance among the mean variations, whenever the 'F' ratio for adjusted test was found to be significant. Altogether cases 0.05 level of significance was fixed to test hypotheses.

Results: The tension and depression confusion were significantly improved by both forms of experimental groups namely the fitness training programme and nutritional counseling with psychological counseling and fitness training programme and nutritional counseling without psychological counseling group among middle aged ladies with hypothyroidism. There was no significant improvement in the selected biochemical variables such as T3, T4 due to both forms of experimental groups among middle aged women with hypothyroidism.

Conclusion: The fitness training programme and nutritional counseling with psychological counseling recommended as complementary therapy for middle aged ladies hypothyroidism

Keywords: Fitness Training, Nutritional Counselling, Psychological Counseling, T3, T4, TSH, Hypothyroidism, Middle Aged Ladies

Introduction

Our body is a blessing from God, he advances us and it's our sole duty to oversee and deal with it well. At the point when God made man, he made him with an ideal solid body. In any case, man, as a result of his unfavorable way of life has demolished that ideal wellbeing by ill-advised nourishment, absence of activity, impeding propensities like smoking, drinking, sedate maltreatment and so forth. This has lead to the reason for a few dangerous sicknesses like circulatory strain, diabetes, heart maladies, thyroid glitch and so on. Thyroid is a vast ductless organ in the neck which secretes hormones controlling development and improvement through the rate of digestion, thyroid capacity and extensive ligament of the larynx, a projection of which shapes the Adam's apple in people. It is a butterfly-molded organ and is made out of

two cone-like projections or wings, lobus dexter or right flap and lobus sinister or left flap, associated through the isthmus. The organ is arranged on the front side of the neck, lying against and around the larynx and trachea, coming to posteriorly the throat and carotid sheath. It begins cranially at the slanted line on the thyroid ligament or Adam's apple and stretches out poorly to roughly the fifth or 6th tracheal ring. It is hard to delineate the organ's upper and lower outskirts with vertebral dimensions since it moves position in connection to these amid gulping. The thyroid organ is secured by a dainty stringy sheath, the capsula glandulae thyreoideae, made out of an inward and outer layer. The outside layer is anteriorly nonstop with the pretracheal belt and back along the side consistent with the carotid sheath. The organ is secured anteriorly with infra thyroid muscles and along the side with the

sternocleidomastoid muscle otherwise called stern mastoid muscle. On the posterior side, the gland is fixed to the cricoid and tracheal cartilage and cricopharyngeus muscle by a thickening of the fascia to form the posterior suspensory ligament of thyroid gland also known as Berry's ligament (Yalçın and Ozan, 2006).

1.1 T3 and T4 regulation

The production of thyroxine and triode thyroxin is regulated by thyroid-stimulating hormone (TSH), released by the anterior pituitary. The thyroid and thyrotropes form a negative feedback loop, TSH production is suppressed when the T4 levels are high. The TSH production itself is modulated by thyrotropin-releasing hormone (TRH), which is produced by the hypothalamus and secreted at an increased rate in situations such as cold exposure to stimulate thermogenesis. TSH production is blunted by somatostatin (SRIH), rising levels of glucocorticoids and sex hormones namely estrogen and testosterone, and excessively high blood iodide concentration. An additional hormone produced by the thyroid contributes to the regulation of blood calcium levels. Parafollicular cells produce calcitonin in response to hypercalcemia. Calcitonin stimulates movement of calcium into bone, in opposition to the effects of parathyroid hormone (PTH). However, calcitonin seems far less essential than PTH, as calcium metabolism remains clinically normal after removal of the thyroid (thyroidectomy), but not the parathyroid's (Johannes, 2002).

1.2 Hypothyroidism

Hypothyroidism is the underproduction of the thyroid hormones T3 and T4. Hypothyroid issue may happen because of inborn thyroid anomalies, immune system issue, for example, Hashimoto's thyroiditis, iodine inadequacy more probable in more unfortunate nations or the evacuation of the thyroid after medical procedure to treat extreme hyperthyroidism and thyroid disease. Commonplace indications are unusual weight gain, tiredness, hairlessness, cold narrow mindedness, and bradycardia. Hypothyroidism is treated with hormone substitution treatment, for example, levothyroxine, which is ordinarily required for whatever remains of the patient's life. Thyroid hormone treatment is given under the consideration of a doctor and may take half a month to wind up powerful. Negative input components result in development of the thyroid organ when thyroid hormones are being created in adequately low amounts, as a methods for expanding the thyroid yield; in any case, where hypothyroidism is brought about by iodine inadequacy, the thyroid can't deliver T3 and T4 and therefore, the thyroid may keep on developing to frame a non-dangerous goiter. It is named non-poisonous as it doesn't create harmful amounts of thyroid hormones, in spite of its size.

1.3 Nutritional Counseling:

Sustenance is the science that deciphers the connection of supplements and different substances in nourishment in connection to support, development, propagation, wellbeing and malady of a creature. It incorporates sustenance consumption, ingestion, absorption, biosynthesis, catabolism and discharge. Nourishment directing is a continuous

procedure in which a wellbeing proficient, more often than not an enrolled dietitian, works with a person to survey his or her standard dietary admission and distinguish zones where change is required. The sustenance advisor gives data, instructive materials, support, and follow-up to support the individual make and keep up the required dietary changes.

Nourishments that are wealthy in iodine are exceptionally prescribed in the battle to avert hypothyroidism. The following is a sorted rundown of good sustenance sources. A portion of the Iodine-Rich Foods for Hypothyroidism incorporates Iodized Salt, Seaweeds and Sea sustenance's and Salt Water Fish. A portion of the Selenium-Rich Foods for Hypothyroidism is Meat, Chicken, Salmon, Tuna, Whole Unrefined Grains Brazil nuts, dairy items, garlic and onions. The thyroid organ needs iodine; along these lines for an underactive thyroid organ needs expanded iodine consumption in the eating regimen. A very much adjusted eating regimen that incorporates iodine can help in reducing the side effects that experience with the condition.

1.4 Psychological Counseling

Advising brain science is a mental forte that envelops inquire about and connected work in a few wide spaces directing procedure and result; supervision and preparing; profession improvement and guiding; and counteractive action and wellbeing. Some bringing together topics among advising therapists incorporate an attention on resources and qualities, person-condition connections, instructive and profession advancement, brief collaborations, and an emphasis on unblemished identities (Gelso and Fretz, 2001).

Transference can be depicted as the customer's mutilated view of the advisor. This can greatly affect the helpful relationship. For example, the advisor may have a facial element that helps the customer to remember their parent. Due to this affiliation, if the customer has noteworthy negative/positive emotions toward their parent, they may extend these sentiments onto the specialist. This can influence the remedial relationship in a couple of ways. For instance, if the customer has a solid bond with their parent, they may see the advisor as a dad or mother figure and have a solid association with their specialist. This can be tricky on the grounds that as a specialist, it isn't moral to have a more than "proficient" association with a customer. It can likewise be something worth being thankful for, in light of the fact that the customer may open up extraordinarily to the advisor. In another way, if the customer has a negative association with their parent, the customer may feel negative emotions toward the advisor. This would then be able to influence the remedial relationship too. For instance, the customer may experience difficulty opening up to the advisor since he/she needs trust in their parent or anticipating these sentiments of doubt onto the specialist (Levy and Scala, 2012).

2. Methods

2.1 Treatment

The motivation behind this investigation was to discover the effect of fitness training programme and nutritional psychological counseling on tension, depression, T3, T4 and TSH among middle aged ladies with hypothyroidism. The investigator randomly selected totally sixty five hypothyroid

middle aged female subjects as certified by endocrinologist who were willing to participate, but the investigator chose only forty five subjects with hypothyroidism who were fit enough to undergo the experimental training treated as subjects. They were selected from the organization of Thyroid care Centers, Coimbatore, Tamil Nadu, India. They were clinically and bio chemically confirmed cases of hypothyroidism and their age ranged between 40 and 50 years. The selected subjects were assigned in to three equal groups. Each group consisted of fifteen (15) subjects. Group I acted as Experimental Group I – (fitness training programme and nutritional counseling with psychological counseling), Group II acted as Experimental Group II – (fitness training programme and nutritional counseling without psychological counseling) and Group III acted as Control Group. The study was formulated as a true random group design consisting of a pre-test and post test. The subjects (N=15) were randomly assigned to three equal groups of fifteen among middle aged women with hypothyroidism- the experimental group I, experimental group II and control group respectively. Pre test was conducted for all the 45 subjects. The experimental groups participated in the respective training for five days per week for a period of 8 weeks programme. The control group did not participate in any of the experimental training programme. After the experimental treatment, all the forty five subjects were measured on the tension, depression, T3, T4, and TSH. The final test scores formed as post test scores of the subjects.

2.2 Experimental Design

The study was formulated as a pretest and posttest random group design, in which sixty female people with hypothyroidism as certified by the endocrinologists were randomly assigned in to three groups namely Experimental group-I fitness training programme and nutritional counseling with psychological counseling, Experimental group-II fitness training programme and nutritional counseling without psychological counseling, and as Control Group (CG). Each group consists of 15 subjects. No attempt was made to equate the groups. The selected subjects were initially tested on criterion variables used in this study and this was considered as the pre-test. After assessing the pre-test, the subjects belonging to Experimental Groups underwent respective training for a period of 12 weeks. Group III acted as control group (CG), the subjects in control group were not engaged in

any experimental training programme other than their regular work. The subjects were free to withdraw their consent in case of feeling any discomfort during the period of their participation but there was no dropout during the study. After twelve weeks of their training programme again the subjects were tested on the same criterion variables as such in the pre-test and considered this as the post-test.

2.3 Statistics

The pretest and post scores were subjected to statistical analysis of Covariance (ANCOVA) to find out the significance among the mean differences, whenever the ‘F’ ratio for adjusted test was found to be significant. In all cases 0.05 level of significance was fixed to test hypotheses.

3. Results

The statistical analysis comparing the initial and final means of experimental group I, experimental group II and control group on Tension is presented in (table 1).The pre test scores of experimental group I, experimental group II and control group on tension were 61.53, 62.13 and 63.67 respectively. The post test scores of experimental group I, experimental group II and control group on tension were 53.20, 59.47 and 61.40 respectively. The ordered adjusted mean scores of experimental group I, experimental group II and control group on tension were 53.68, 59.63 and 60.76 respectively. The mean gain in the experimental group I, experimental group II and control group on tension were 8.33, 2.67 and 2.27 respectively. The obtained F value on pre test scores 2.07 was less than the required F value of 3.22, 3.23 to be significant at 0.05 level. This proved that there were no significant deference between the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups. The post test scores analysis proved that there were significant differences between groups, as the obtained F value 37.62 was greater than the required F value of 3.22, 3.23. This proved that the differences between the post test means of the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value of 40.76 was greater than the required F value 3.22, 3.23. This proved that there was a significant difference among the means due to the experimental training on tension.

Table 1: Computation of analysis of tension

Test	Mean			SV	Sum of Squares	df	Mean Squares	Obtained F
	Experimental Group- I (ftncwpc)	Experimental Group – II (Ftpncwopc)	Control Group (CG)					
Pre test	61.53	62.13	63.67	B	36.31	2	18.16	2.07
				W	368.80	42	8.78	
Post test	53.20	59.47	61.40	B	551.24	2	275.62	37.62*
				W	307.73	42	7.33	
Adjusted	53.68	59.63	60.76	B	407.99	2	203.99	40.76*
				W	205.19	41	5.00	
Mean gain	8.33	2.67	2.27					

Table-1 F – ratio at 0.05 level confidence for 3 and 42(df) = 3.22, 3 and 41 (df) = 3.23 *Significant

Table 2: Computation of analysis of depression

Test	Mean			SV	Sum of Squares	DF	Mean Squares	Obtained F
	Experimental Group- I (FTPNCWPC)	Experimental Group – II (FTPNCWOPC)	Control Group (CG)					
Pre test	85.60	81.20	85.00	B	170.80	2	85.40	1.22
				W	2950.00	42	70.24	
Post test	55.40	66.47	83.33	B	5936.13	2	2968.07	30.43*
				W	4096.67	42	97.54	
Adjusted	55.71	65.95	83.53	B	5939.40	2	2969.70	30.50*
				W	3992.63	41	97.38	
Mean gain	30.20	14.73	1.67					

Table-2 F – ratio at 0.05 level confidence for 3 and 42(df) = 3.22, 3 and 41 (df) = 3.23

*Significant

The statistical analysis comparing the initial and final means of experimental group I, experimental group II and control group on Depression is presented in (table 2). The pre test scores of experimental group I, experimental group II and control group on depression were 85.60, 81.20 and 85.00 respectively. The post test scores of experimental group I, experimental group II and control group on depression were 55.40, 66.47 and 83.33 respectively. The ordered adjusted mean scores of experimental group I, experimental group II and control group on depression 55.71, 65.75 and 83.53 respectively. The mean gain in the experimental group I, experimental group II and control group on tension were 30.20, 14.73 and 1.67 respectively. The obtained F value on pre test scores 1.22 was less than the required F value of 3.22, 3.23 to be significant at 0.05 level. This proved that there were

no significant deference between the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups. The post test scores analysis proved that were significant differences between groups, as the obtained F value 30.43 was greater than the required F value of 3.22, 3.23. This proved that the differences between the post test means of the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value of 30.50 was greater than the required F value 3.22, 3.23. This proved that there was a significant difference among the means due to the experimental training on depression.

Table 3: Computation of analysis of t3

Test	Mean			SV	Sum of Squares	df	Mean Squares	Obtained F
	Experimental Group- I (FTPNCWPC)	Experimental Group – II (FTPNCWOPC)	Control Group (CG)					
Pre test	0.9000	0.8980	0.9007	B	0.00006	2	0.00003	0.48
				W	0.00253	42	0.00006	
Post test	0.8973	0.8967	0.8993	B	0.00006	2	0.00003	0.33
				W	0.00372	42	0.00009	
Adjusted	0.8969	0.8983	0.8981	B	0.00002	2	0.00001	0.48
				W	0.00083	41	0.00002	
Mean gain	0.0027	0.0013	0.0013					

Table F – ratio at 0.05 level confidence for 3 and 42(df) = 3.22, 3 and 41 (df) = 3.23 *Significant

The statistical analysis comparing the initial and final means of experimental group I, experimental group II and control group on T3 is presented in (table 3).The pre test scores of experimental group I, experimental group II and control group on T3 were 0.90, 0.90 and 0.90 respectively. The post test scores of experimental group I, experimental group II and control group on T3 were 0.90, 0.90 and 0.90 respectively. The ordered adjusted mean scores of experimental group I, experimental group II and control group on T3 were 0.90, 0.90 and 0.90 respectively. The mean gain in the experimental group I, experimental group II and control group on T3 were 0.0027, 0.0013 and 0.0013 respectively. The obtained F value on pre test scores 0.48 was less than the required F value of 3.22, 3.23 to be significant at 0.05 level. This proved that

there were no significant deference between the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups. The post test scores analysis proved that were significant differences between groups, as the obtained F value 0.33 was less than the required F value of 3.22, 3.23. This proved that the differences between the post test means of the subjects were no significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value of 0.48 was less than the required F value 3.22, 3.23. This proved that there was a no significant difference among the means due to the experimental training on T3.

Table 4: Computation of Analysis of T4

Test	Mean			SV	Sum of Squares	df	Mean Squares	Obtained F
	Experimental Group-I (FTPNCWPC)	Experimental Group - II (FTPNCWOPC)	Control Group (CG)					
Pre test	6.62	6.64	6.64	B	0.0075	2	0.0037	1.37
				W	0.1142	42	0.0027	
Post test	6.66	6.66	6.65	B	0.0013	2	0.0006	0.30
				W	0.0892	42	0.0021	
Adjusted	6.66	6.66	6.64	B	0.0019	2	0.0009	0.46
				W	0.0844	41	0.0021	
Mean gain	0.0400	0.0160	0.0033					

Table F – ratio at 0.05 level confidence for 3 and 42(Df) = 3.22, 3 and 41 (DF) = 3.23 *Significant

The statistical analysis comparing the initial and final means of experimental group I, experimental group II and control group on T4 is presented in (table 4). The pre test scores of experimental group I, experimental group II and control group on T4 were 6.62, 6.64 and 6.64 respectively. The post test scores of experimental group I, experimental group II and control group on T4 were 6.66, 6.66 and 6.65 respectively. The ordered adjusted mean scores of experimental group I, experimental group II and control group on T4 were 6.66, 6.66 and 6.64 respectively. The mean gain in the experimental group I, experimental group II and control group on T4 were 0.0400, 0.0160 and 0.0033 respectively. The obtained F value on pre test scores 1.37 was less than the required F value of 3.22, 3.23 to be significant at 0.05 level. This proved that

there were no significant deference between the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups. The post test scores analysis proved that there were significant differences between groups, as the obtained F value 0.30 was less than the required F value of 3.22, 3.23. This proved that the differences between the post test means of the subjects were no significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value of 0.46 was less than the required F value 3.22, 3.23. This proved that there was no significant difference among the means due to the experimental training on T4.

Table 5: Computation of analysis of tsh

Test	Mean			SV	Sum of Squares	df	Mean Squares	Obtained F
	Experimental Group-I (FTPNCWPC)	Experimental Group - II (FTPNCWOPC)	Control Group (CG)					
Pre test	7.29	7.30	7.32	B	0.0061	2	0.0030	1.83
				W	0.0700	42	0.0017	
Post test	7.32	7.32	7.33	B	0.0014	2	0.0007	2.00
				W	0.0142	42	0.0003	
Adjusted	7.33	7.32	7.33	B	0.0006	2	0.0003	1.10
				W	0.0112	41	0.0003	
Mean gain	0.0333	0.0233	0.0147					

Table F – ratio at 0.05 level confidence for 3 and 42(df) = 3.22, 3 and 41 (df) = 3.23 *Significant

The statistical analysis comparing the initial and final means of experimental group I, experimental group II and control group on TSH is presented in (table 5). The pre test scores of experimental group I, experimental group II and control group on TSH were 7.29, 7.30 and 7.32 respectively. The post test scores of experimental group I, experimental group II and control group on TSH were 7.32, 7.32 and 7.33 respectively. The ordered adjusted mean scores of experimental group I, experimental group II and control group on TSH were 7.33, 7.32 and 7.33 respectively. The mean gain in the experimental group I, experimental group II and control group on TSH were 0.03, 0.02 and 0.02 respectively. The obtained F value on pre test scores 1.83 was less than the required F value of 3.22, 3.23 to be significant at 0.05 level. This proved that there were no significant deference between the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups. The post test scores analysis proved that there were significant differences between groups, as the obtained F

value 2.00 was less than the required F value of 3.22, 3.23. This proved that the differences between the post test means of the subjects were no significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value of 1.10 was less than the required F value 3.22, 3.23. This proved that there was a no significant difference among the means due to the experimental training on TSH.

4. Discussion

The results presented in (table 1) showed that obtained adjusted means on tension among fitness training programme and nutritional counseling with psychological counseling group was 53.68 followed by Physical fitness training programme and nutritional counseling without psychological counseling group was 59.63 and control group with mean value 60.76. The differences among pre test scores, post test scores and adjusted mean scores of the subjects were

statistically treated using ANCOVA and F value were 2.07, 37.62 and 40.76 respectively. It was found that obtained F value on pre test scores were not significant at 0.05 level of confidence as these were lesser than the required table F value of 3.22, 3.23 and the obtained F values on post test and adjusted means were significant at 0.05 level of confidence as these were greater than the required table F value of 3.22, 3.23.

The results presented in (table 2) showed that obtained adjusted means on depression among fitness training programme and nutritional counseling with psychological counseling group was 55.71 followed by Physical fitness training programme and nutritional counseling without psychological counseling group was 65.75 and control group with mean value 83.53. The differences among pre test scores, post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and F value were 1.22, 30.43 and 30.50 respectively. The obtained F values on pre test were not significant at 0.05 level of confidence as these were lesser than the required table F value of 3.22,3.23 and the obtained F values on post test and adjusted means were significant at 0.05 level of confidence as these were greater than the required table F value of 3.22,3.23.

The results presented in (table 3) showed that obtained adjusted means on T3 among fitness training programme and nutritional counseling with psychological counseling group was 0.90 followed by Physical fitness training programme and nutritional counseling without psychological counseling group was 0.90 and control group with mean value 0.90. The differences among pre test scores, post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and F value were 0.48, 0.33 and 0.48 respectively. The obtained F values on pre test, post test and adjusted means were not significant at 0.05 level of confidence as these were lesser than the required table F value of 3.22,3.23.

The results presented in (table 4) showed that obtained adjusted means on T4 among fitness training programme and nutritional counseling with psychological counseling group was 6.66 followed by Physical fitness training programme and nutritional counseling without psychological counseling group was 6.66 and control group with mean value 6.64. The differences among pre test scores, post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and F value were 1.37, 0.30 and 0.46 respectively. The obtained F values on pre test, post test and adjusted means were not significant at 0.05 level of confidence as these were lesser than the required table F value of 3.22,3.23.

The results presented in (table 5) showed that obtained adjusted means on TSH among fitness training programme and nutritional counseling with psychological counseling group was 7.33 followed by Physical fitness training programme and nutritional counseling without psychological counseling group was 7.32 and control group with mean value 7.33. The differences among pre test scores, post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and F value were 1.83, 2.00 and 1.10 respectively. The obtained F values on pre test, post test and adjusted means were not significant at 0.05 level of

confidence as these were lesser than the required table F value of 3.22,3.23.

5. Conclusion

The tension, depression, were significantly improved by both forms of experimental groups namely the fitness training programme and nutritional counseling with psychological counseling and fitness training programme and nutritional counseling without psychological counseling group among middle aged ladies with hypothyroidism.

There was no significant improvement in the selected biochemical variables such as T3, T4 and TSH due to both forms of experimental groups among middle aged ladies with hypothyroidism.

Disclosure Interest

The authors declare that they have no competing interest.

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References

1. Auer J, Scheibner P, Mische T, Langsteger W, Eber O, Eber B. Subclinical hyperthyroidism as a risk factor for atrial fibrillation. *American Heart Journal*. 2001; 142:838-842.
2. Alexander EK, Marqusee E, Lawrence J, Jarolim P, Fischer GA, Larsen PR. Timing and magnitude of increases in levothyroxine requirements during pregnancy in women with hypothyroidism. *New England Journal of Medicine*. 2004; 351:241-249.
3. Bar-Sela S, Ehrenfeld M, Eliakim M. Arterial embolism in thyrotoxicosis with atrial fibrillation. *Archives of Internal Medicine*. 1981; 141:1191-1192.
4. Baskin HJ. American Association of Clinical Endocrinologists guidelines for clinical practice for the evaluation and treatment of hyperthyroidism and hypothyroidism. *Endocr Practice*. 2002; 8:458-467.
5. Brennan MD, Klee GG, Preissner CM, Hay ID. Heterophilic serum antibodies: a cause for falsely elevated serum thyrotropin levels. *Mayo Clin Proc*. 1987; 62:894-898.
6. Bhakri HL, Fisher R, Khadri A, MacMahon DG. Longitudinal study of thyroid function in acutely ill elderly patients using a sensitive TSH assay—defer testing until recovery. *Gerontology*. 1990; 36:140-144.
7. Chu JW, Crapo LM. Clinical perspective: the treatment of subclinical hypothyroidism is seldom necessary. *J Clin Endocrinol Metab*. 2001; 86:4591-4599.
8. Canaris GJ, Manowitz NR, Mayor G, Ridgway EC. The Colorado Thyroid Disease Prevalence Study. *Arch Intern Med*. 2000; 160:526.
9. Cooper DS. Clinical practice: subclinical hypothyroidism. *N Engl J Med*. 2001; 345:260-265.
10. Toft AD. Clinical practice: subclinical hyperthyroidism. *N Engl J Med*. 2001; 345:512-516.
11. Govindasamy K. Effect of Pranayama with Meditation on

- Selected Psychological Variables Among school Girls. Modern Perspectives of Sports Science and Yoga for the Enhancement of Sports Performance.2018; 209-211.
12. Kumaravelu P, Govindasamy K, Prabhakaran V. Effect of yoga therapy on selected bio-chemical variables among diabetic mellitus middle aged men Virudhunagar district. International Journal of Yoga, Physiotherapy and Physical Education. 2018; 3(2):152-154.
 13. Govindasamy K. Effect of yogic practice on selected biochemical variables among obese middle age school boys. International Journal of Yogic, Human Movement and Sports Sciences. 2017; 2(2):393-396. DOI: <https://doi.org/10.22271/yogic.2018.v2.i2h.01>
 14. Kumaravelu P, Anitha J, Lakshmanan C, Govindasamy K. Effect of sport loading training on selected physical fitness variables among the coastal area womens basketball players. International Journal of Health, Physical Education & Computer Science and Sports. 2018; 32(1):47-51.