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EFFECTS OF 12-WEEK RESISTANCE TRAINING ON POSTMENOPAUSAL WOMEN WITH VERSUS WITHOUT HYPOTHYROIDISM

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ABSTRACT

Background: Thyroid disorders are more prevalent in postmenopausal women and tend to worsen with age. Hypothyroidism was present in 12.7% of postmenopausal women and 82% of premenopausal women. To address the diagnostic and treatment challenges during the menopausal transition and assist medical professionals in raising awareness of menopause-related issues, a great deal of research must be done.

Objective: The goal of the study is to compare the improvements in skeletal health after 12 weeks of resistance training muscle mass, strength, and physical performance in postmenopausal women with hypothyroidism to those without the condition.

Methods: A total of 30 subjects were selected based on the selection criteria and divided into two groups by random sampling method body mass index and short physical performance battery scales. Group A - consists of 15 subjects who were post menopausal women with hypothyroidism were treated with resistance training exercise (squats ,leg press, lunges, chest press , wall pushups ,bird dogs , glute bridges) for 5days per week for 12 weeks .Group B- consists of 15 subjects who were post menopausal women without hypothyroidism were treated with resistance training exercise (squats ,leg press, lunges, chest press , wall pushups ,bird dogs, glute bridges) for 5days per week for 12 weeks. Both the groups were received Warm up (5 minutes) and cool down (5 minutes) for 5 sessions a week. The interventions were carried out for 12 weeks. The post scores were recorded. The pre and post test data were analysed. The subjects were instructed that if they developed any pain or injury during the intervention period then they will excluded from the study.

Results: Result of this study shows that resistance training is effective in increasing in skeletal muscle mass, strength and physical performance in post menopausal women in without hypothyroidism.

Conclusion: Conclusion of the study concluded that both the post menopausal women with hypothyroidism and post menopausal women without hypothyroidism are effective in improving skeletal muscle mass, strength and physical performance in subjects with post menopausal women.

Keywords: Post menopausal women hypothyroidism , without hypothyroidism ,resistance training , skeletal muscle mass

INTRODUCTION:

The background of the study is Thyroid disorders are more prevalent in postmenopausal women and tend to worsen with age. Hypothyroidism was present in 12.7% of postmenopausal women and 82% of premenopausal women. To address the diagnostic and treatment challenges during the menopausal transition

and assist medical professionals in raising awareness of menopause-related issues, a great deal of research must be done. The objective of the study is to compare the improvements in skeletal health after 12 weeks of resistance training muscle mass, strength, and physical performance in postmenopausal women with hypothyroidism to those without the condition

When the body does not produce enough thyroid hormone, it can lead to hypothyroidism, a common endocrine system issue. Low levels of thyrotropin (TSH) from the pituitary gland can occasionally getting your period for 12 consecutive months following your last menstrual cycle is known as menopause [1].Women typically experience menopause between the ages of 45 and 55. When a woman has not experienced vaginal bleeding for a full year, doctors frequently declare that she has entered menopause. It can also be identified by a decrease in the ovaries' production of hormones. Hormone levels in a woman's body change during menopause. It may take some time to adjust to these changes because hormones regulate a lot of bodily processes. Menopausal symptoms are occasionally, but not always, associated with these hormonal changes [2].

When the body does not produce enough thyroid hormone, it can lead to hypothyroidism, a common endocrine system issue. Low levels of thyrotropin (TSH) from the pituitary gland can occasionally be the cause, which means the thyroid doesn't receive enough signals to function correctly. Low levels of TSH result from the hypothalamus's insufficient release of thyrotropin-releasing hormone (TRH) in tertiary hypothyroidism. As a result, the thyroid is not appropriately stimulated [3].

As previously mentioned, dyslipidemia, a known risk factor for heart issues, is associated with thyroid disease. Insulin resistance and oxidative stress are two detrimental cycles that can result from dyslipidemia. Regardless of dyslipidemia, thyroid disease alone can also lead to an increase in insulin resistance, hypertension, inflammation, oxidative stress, and blood clotting issues. These links imply that dyslipidemia is a major contributing factor to the multiple causes of atherosclerosis in thyroid disease.[4]

Because it can result in more severe hypothyroidism, subclinical hypothyroidism is significant. Additionally, it has been connected to alterations in cholesterol levels, an increased risk of heart disease, congestive heart failure, mental health problems, and a decrease in muscle strength, particularly when blood TSH levels are higher than 10 µIU/mL [5].Serum free T3 and free T4 levels stay normal when the serum TSH level is higher than 5.5 mIu/ml. Although mild thyroid failure typically has no symptoms, 30% of patients may have symptoms that indicate a thyroid hormone deficiency [6]

Menopausal hormonal changes can frequently result in symptoms that resemble hypothyroidism. As a result, this condition is frequently overlooked [7].People frequently have thyroid issues, particularly women who have experienced menopause, and the likelihood of developing one rises with age. 1.3% of people in the US have hyperthyroidism, compared to 4.6% who have hypothyroidism [8].
Muscle tissue may be directly impacted by the drop in estrogen, exacerbating the detrimental effects of menopause on women's health [10].Studying the relationship between muscles and estrogen is crucial because women's muscle mass and function begin to deteriorate as they enter the postmenopausal phase. Ovarian hormone levels significantly decline in women who undergo surgery or naturally experience premature menopause (PM). According to one study, compared to similarly aged premenopausal women (34.30 pg/mL, with a range of 25.3-44.9 pg/mL), women under 40 who underwent surgical PM had lower average blood levels of estradiol (7.15 pg/mL, with a range of 5.0-20.5 pg/mL). Women who had surgical PM also experienced a significant drop in testosterone levels [11].

It's important to note that women who have gone through menopause and have less muscle mass are 2.1 times more likely to fall and 2.7 times more likely to break a bone than women who have maintained their muscle mass[12].These changes affect a woman's body by causing weight gain, more fat around the belly, and a decrease in both the quality and quantity of skeletal muscle mass (SMM)[13].

The type of exercise you do has a big impact on its benefits. It is commonly known that resistance training (RT) increases muscle size and strength and can also help with sarcopenia-related problems [17]. It is evident that developing well-rounded exercise regimens for women going through early menopause is difficult

because most exercise programs concentrate on a single objective or condition. In two previous studies we developed a adaptable exercise program just for early-menopausal women.[18]

METHODOLOGY

Study Design: Experimental
Participants:

Inclusion Criteria : post menopausal women with and without hypothyroidism, person age group between 40-50 , physical activity status ,patient who scores 25.0 -29.0 in bmi (body mass index) , patient who scores (4-6)- (7-9) in sppb scale (short performance physical battery).

Exclusion Criteria : the women who have musculoskeletal condition, endocrine and metabolic disorders, contra indication to exercise, uncontrolled medical conditions, the patient above 65 , person with bmi score above > 35 , the patient sppb score (0-3).Inclusion and exclusion criteria

Intervention/Procedure: A total of 30 subjects were selected based on the selection criteria and divided into two groups by random sampling method body mass index and short physical performance battery scales

Group A - consists of 15 subjects who were post menopausal women with hypothyroidism were treated with resistance training exercise (squats ,leg press, lunges, chest press , wall pushups ,bird dogs , glute bridges) for 5days per week
for 12 weeks .
Group B- consists of 15 subjects who were post menopausal women without
hypothyroidism were treated with resistance training exercise (squats ,leg press, lunges, chest press , wall pushups ,bird dogs , glute bridges) for 5days per week for 12 weeks.
Both the groups were received Warm up (5 minutes) and cool down (5 minutes) for 5 sessions a week. The interventions were carried out for 12 weeks. The post scores were recorded. The pre and post test data were analysed. The subjects were instructed that if they developed any pain or injury during the intervention period then they will excluded from the study.

Outcome Measures: Improvement of skeletal muscle mass, physical performance gain.

Statistical Analysis: BMI, SPPB(short physical performance battery).

RESULTS

The collected data were tabulated and analyzed using both descriptive and inferential statistics. All the parameters were assessed using statistical package for social science (SPSS) version 24, with a significance level of p value less than 0.05 and a 95% confidence interval set for all analysis. The Shapiro Wilk test was used to determine the normality of the data. In this study, Shapiro Wilk test showed that the data was normally distributed on the dependent values at $P > 0.05$. Hence parametric test was adopted. Paired t-test was adopted to find the statistical difference within the groups & Independent t-test (Student t-Test) was adopted to find statistical difference between the groups.

On comparing the Mean Values of Group A & Group B on BMI Score, it shows a significant decrease in the post test mean values in both groups, but (Group B) shows 28.86 ±1.08 which has the lower mean value is more effective than (Group A) 27.88 ±.783 at $P \leq 0.05$. Hence the null hypothesis is rejected. On comparing the Mean Values of Group A & Group B on SPPB Score, it shows a significant increase in the post test mean values in both groups, but (Group B) shows 8.53 ±.516 which has the higher mean value is more effective than (Group A) 7.60 ±.507 at $P \leq 0.05$. Hence the null hypothesis is rejected. On comparing Pre test and Post test within Group A & Group B on BMI Score & SPPB Score shows significant difference in the mean values at $P \leq 0.05$.

TABLE-1

COMPARISON OF BMI SCORE BETWEEN

GROUP – A AND GROUP - B IN PRE AND POST TEST

TEST	GROUP - A	GROUP - B	t - TEST	df	SIGNIFICANCE		
	MEAN	S.D	MEAN	S.D			
PRE TEST	29.38	1.08	28.80	0.823	1.64	28	.110 *
POST TEST	28.86	1.08	27.88	0.783	2.83	28	.001**

(*- P > 0.05 - Not Significant) & (- P ≤ 0.05 - Significant).**

The above table reveals the Mean, Standard Deviation (S.D), t-test, degree of freedom (df) and p-value between Group A & Group B in pre test and post test.

This table shows that there is no significant difference in pre test values between Group A & Group B at P > 0.05

The above table shows that statistically significant difference in post test values between Group A & Group B at P ≤ 0.05.

GRAPH – I

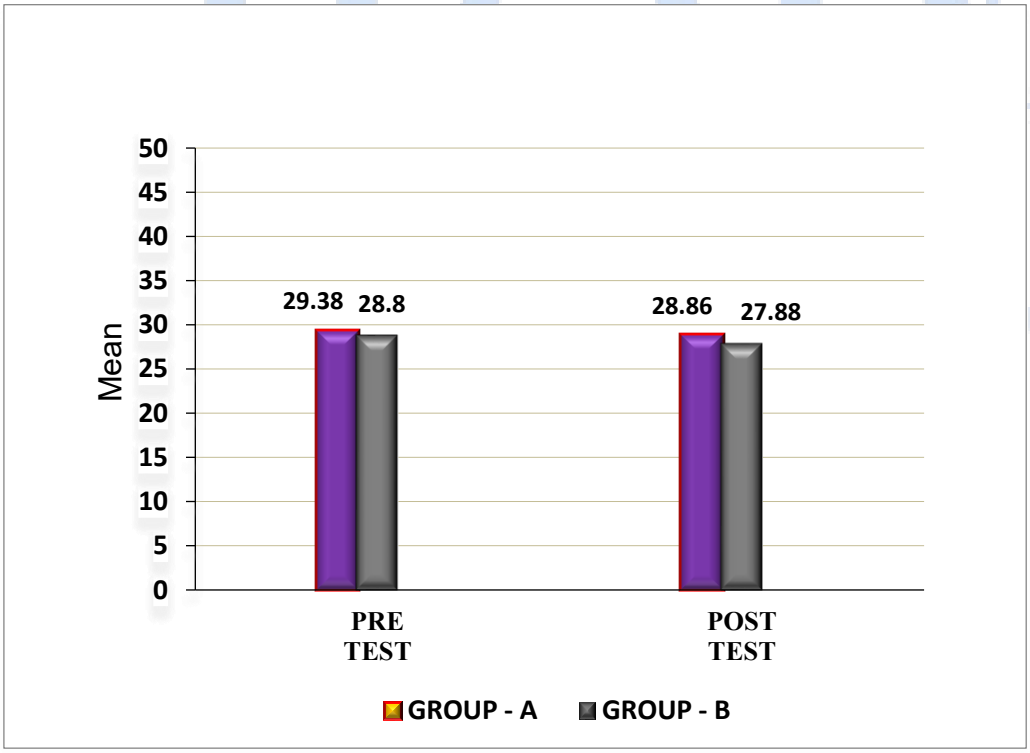


TABLE – 2

COMPARISON OF SPPB SCORE BETWEEN GROUP – A AND GROUP - B IN PRE AND POST TEST

TEST	GROUP - A	GROUP - B	t - TEST	df	SIGNIFICANCE		
	MEAN	S.D	MEAN	S.D			
PRE TEST	6.06	0.593	6.20	0.676	-0.574	28	.571*
POST TEST	7.60	0.507	8.53	0.516	-4.99	28	.001**

(*- P > 0.05 - Not Significant) & (- P ≤ 0.05 - Significant).**

The above table reveals the Mean, Standard Deviation (S.D), t-test, degree of freedom (df) and p-value between Group A & Group B in pre test and post test.

This table shows that there is no significant difference in pre test values between Group A & Group B at P > 0.05

The above table shows that statistically significant difference in post test values between Group A & Group B at P ≤ 0.05.

GRAPH – II

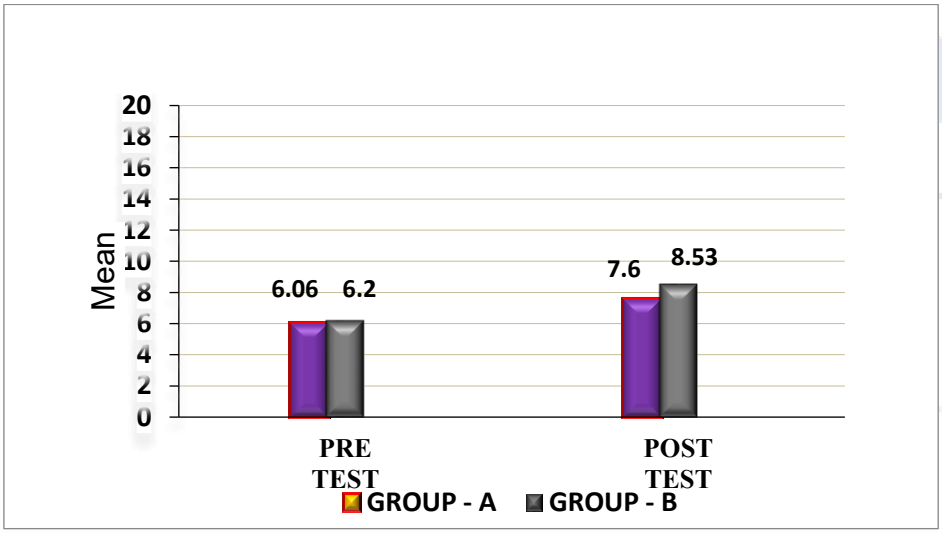


TABLE- 3

COMPARISON OF BMI SCORE WITHIN GROUP – A AND GROUP - B BETWEEN PRE TEST AND POST TEST

GROUPS	PRE TEST	POST TEST	t - TEST	SIGNIFICANCE		
	MEAN	S.D	MEAN	S.D		
GROUP- A	29.38	1.08	28.86	1.08	12.55	.000**
GROUP- B	28.80	0.823	27.88	0.783	10.15	.000**

(- P ≤ 0.05 - Significant).**
The above table reveals the Mean, Standard Deviation (S.D), t-value and p-value between pre-test and post-test within Group – A & Group – B.

There is a statistically significant difference between the pre test and post test values within Group A and Group B at P ≤ 0.05.

GRAPH - III COMPARISON OF BMI SCORE WITHIN GROUP – A AND GROUP - B BETWEEN PRE TEST AND POST TEST

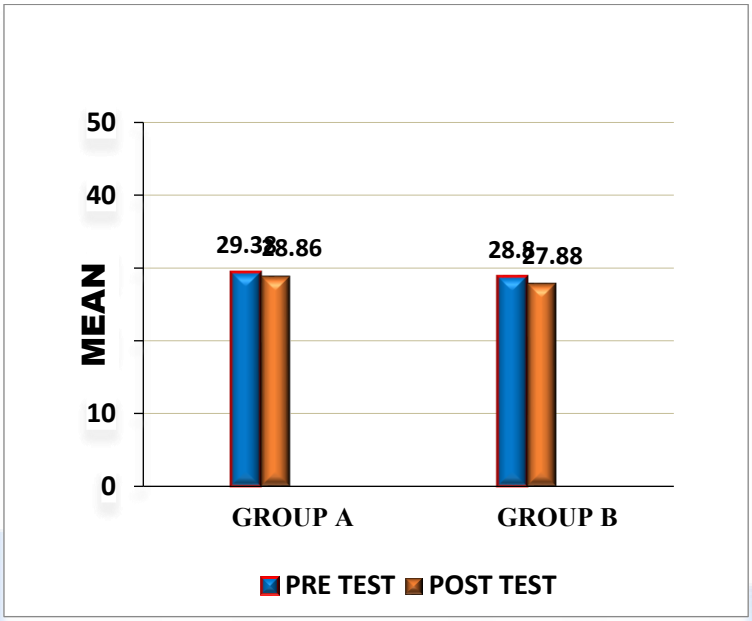


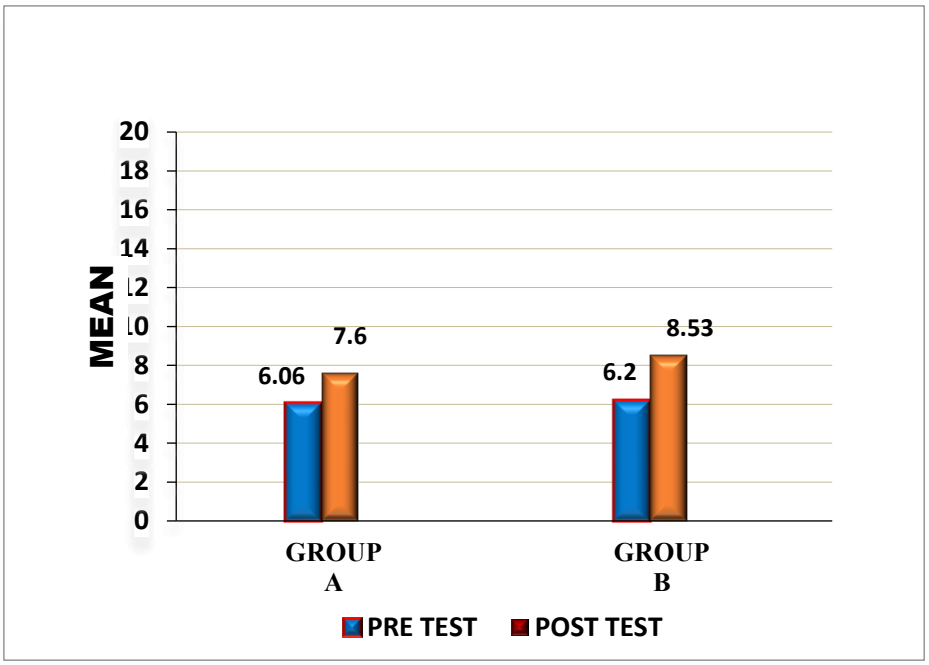
TABLE - 4
COMPARISON OF SPPB SCORE WITHIN GROUP – A AND GROUP - B BETWEEN PRE TEST AND POST TEST

GROUPS	PRE TEST	POST TEST	t - TEST	SIGNIFICANCE		
	MEAN	S.D	MEAN	S.D		
GROUP- A	6.06	0.593	7.60	0.507	-11.50	.000**
GROUP- B	6.20	0.676	8.53	0.516	-18.52	.000**

(- P ≤ 0.05 - Significant).**
The above table reveals the Mean, Standard Deviation (S.D), t-value and p-value between pre-test and post-test within Group – A & Group – B.

There is a statistically significant difference between the pre test and post test values within Group A and Group B at P ≤ 0.05.

GRAPH – IV COMPARISON OF SPPB SCORE WITHIN GROUP – A AND GROUP - B BETWEEN PRE TEST AND POST TEST



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DISCUSSION

The principle finding of the present study was that resistance training was more effective in improving muscle mass , strength, physical performance gains in post menopausal women in without hypothyroidism patients as measured by body mass index , sppb short physical performance battery .
The strengths of this study include several key factors: the criteria for including subjects created a uniform group of participants, and the resistance training (RT) load, volume, and frequency were consistent (with 85% of RT sessions being the same across both RT plans). To avoid bias, the exercise methods were monitored.All participants received close supervision from experienced fitness professionals and showed high commitment to the program. Additionally, research has indicated that supervised resistance training with a fitness expert, like a personal trainer, leads to more significant gains in muscle mass and strength compared to unsupervised training. **Claudio L. Orsatti et al**

Aerobic training showed greater positive effects on reducing fat mass, while resistance training had more significant benefits for increasing muscle mass. Most of these positive outcomes seem to happen with medium- and long-term programs, especially in middle-aged and older women who have gone through menopause. **Aref Habibi Maleki et al**

We wanted to look into how postmenopausal women experience a resistance training program. Around the world, women are generally less active than men, and their activity levels drop as they get older. It's estimated that only about 20% of women around menopause do enough muscle-strengthening exercises that are recommended for good health. This study offers helpful information that could be useful when setting up exercise programs for postmenopausal women. **Anna-Clara Spetz Holm et al**

These findings show that muscle and bone tissues respond to the changes that come with menopause. Physical activity helps maintain muscle mass in middle- aged women going through menopause. However, it is less clear how physical activity affects bone mineral density (BMD), and figuring this out may need a longer follow-up after menopause. **Sarianna Sipilä et al**

Based on these findings, bone and muscle tissues respond to menopausal changes.. They also suggest that staying active helps middle-aged women keep their muscle mass during this time. However, the effect of physical activity on bone mineral density (BMD) is not as straightforward, and understanding this may need a longer follow-up after menopause. **Marianna Bellafiore et al**

In table -1 On comparing the Mean Values of Group A & Group B on BMI Score, it shows a significant decrease in the post test mean values in both groups, but (Group B) shows 28.86 ±1.08 which has the lower mean value is more effective than (Group A) 27.88 ±.783 at P ≤ 0.05. Hence the null hypothesis is rejected. In Table - 2 On comparing the Mean Values of Group A & Group B on SPPB Score, it shows a significant increase in the post test mean values in both groups, but (Group B) shows 8.53 ±.516 which has the higher mean value is more effective than (Group A) 7.60 ±.507 at P ≤ 0.05. Hence the null hypothesis is rejected. In table -3 On comparing Pre test and Post test within Group A & Group B on BMI Score & SPPB Score shows significant difference in the mean values at P ≤ 0.05.

CONCLUSION

Conclusion of the study concluded that both the post menopausal women with hypothyroidism and post menopausal women without hypothyroidism are effective in improving skeletal muscle mass ,strength and physical performance in subjects with post menopausal women but the result concluded Group B post menopausal women without hypothyroidism is more effective in improving skeletal muscle mass ,strength and physical performance than Group A post menopausal women with hypothyroidism .Hence it concluded the menopausal women without hypothyroidism is more effective than with hypothyroidism **.**

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