

Efficacy of Resisted Exercises and Dietary Measures on Obesity

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doi: <http://dx.doi.org/10.13005/bbra/1553>

(Received: 21 July 2014; accepted: 20 September 2014)

This research study aims to evaluate the efficacy of resisted exercises with dietary measures among obese individuals. 100 obese subjects between 30-60 years age both sex at random were allotted in two groups. Group I with no specific physical activities, Group II dietary means with resisted exercises thrice weekly for 12 weeks between the period from January to March 2014. All the subjects BMI and waist circumference were found once at baseline and after a period of 12 weeks following the resisted exercise regime. Waist circumference has decreased by 6cm and BMI reduced by 1.8 kg/m² among experimental subjects, Reduction in waist circumference and BMI as results indicated resisted exercise and dietary means are highly beneficial for individuals health and economy.

Key words: ACSM- American college of Sports Medicine. Physio ball - An inflatable ball of 500mm to 650mm in diameter. Isometric - Type of muscle contraction with no changes in length.

Obesity has become a major public health concern globally¹ and is related to an increased blood pressure, dyslipidemia, Type 2 diabetes mellitus and cardio vascular risk². Central obesity indicated deposition of large quantities of abdominal fat, which consist of visceral fat and subcutaneous fat, increases the risk of diabetes and hyperlipidemia³.

Asian Indians have a greater degree of central obesity⁴. Non communicable diseases and risk factors including obesity are equally seen in

rural areas as seen in urban areas in India⁵. Major dietary changes due to urbanization and affluence results in substitution of unrefined wheat, rice, or millets by highly polished wheat or rice, increase intake of fat is also seen in high income group⁶. Adaptation of western life style with physical inactivity among children and youth have fueled to the increase of obesity prevalence and its associated risk factors⁷. The worldwide obesity epidemic and its accompanying pathologies of type 2 diabetes mellitus and cardio vascular diseases have under scored the need for effective weight loss strategies⁸.

The objective of this research study is to evaluate the impact of resisted exercises along with dietary measures among obese subjects on anthropometric parameters such as BMI and waist circumference.

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Ethical committee clearance was obtained for this research study and consent forms from all the subjects were duly signed and recorded.

MATERIALS AND METHODOLOGY

100 obese individuals of both sex between the age group of 20-60 years were recruited for this study. Their baseline history at health

information were obtained and recorded. All the participants were randomly allotted in two groups.

All the subjects continued their daily routine activities and any medication for systemic illness as prescribed by physician. Group I – no specific activity. Group II – 15 set of exercises using an air inflatable ball with a diameter between 55cms–65cms were performed with the supervision of physiotherapist .

No	Period	Sets	Duration	Repetition	Isometric holding periods
1	1 – 4 weeks	15	20 minutes	No	No
2	5 – 8 weeks	15	35 minutes	3	5 seconds
3	9 – 12 weeks	15	50 minutes	6	10 seconds

ACSM guidelines were followed with progression of exercises. Activities were done with ball for both upper and lower extremities. Supine lying, side lying, prone lying were the postures used for the performance of exercises. Specific dietary instruction were given to Group II subjects only by dietician. This research was conducted at Sree Balaji College of Physiotherapy during the period from January 2014 to March 2014, all the subjects height, weight and waist circumference at iliac crest were measured twice-once at baseline and after 12 weeks of study BMI and waist circumferences were calculated and recorded.

Inclusion criteria:

Subjects between 30-60 years of both sex, Haemodynamically stable on medication for thyroid, Type II diabetic, dyslipidemia.

Exclusion criteria:

Critically bed ridden, Psychiatric, Obese individuals.

Tools of measurement:

BMI (Body Mass Index) calculated from height in centimeters and weight in Kg, waist circumference in centimeters.

RESULTS

All the subjects' BMI and waist circumferences were measured before starting the study and after 12 weeks, were statistically analyzed and the results were displayed as in table.

DISCUSSION

Exercise in combination with dietary changes promotes loss of adipose tissue with preservation of lean body mass⁹. A reduction in obesity with life style modification, resulted in reduced risk of cardio vascular risk factors. It is also cost effective and promotes individual wellbeing¹⁰ reduction in BMI with diet and resisted

Table 1. All the subjects Baseline health information

S.No	Baseline health information	Percentage (%)
1	Steroid (oral)	4%
2	Thyroid	10%
3	Type II diabetic	19%
4	Dyslipidemia	18%
5	Post menopausal women	15%
6	Not an any medication	34%

Table 2. Results of mean values on BMI and Waist circumference.

BMI Kg/m ²	Group I Mean \pm SD	Group II	Waist circumference(cm)	I	II
Pre mean	28 \pm 1.05	27.8 \pm 4.54	Pre mean	122 \pm 1.57	126
Post mean	29	26	Post mean	124 \pm 12.12	120

Table 3. Results of paired “t” test on BMI of group I and II

	SE	T	P
Group I	.22	.53	0.01
Group II	.65	3.6	.005

Table 4. Results of paired “t” test on waist circumference of group I and group II.

	SE	T	P
Group I	.22	-2.45	.01
Group II	1.73	6.83	.001

exercises among normal subjects¹¹, another study where dietary measures with aerobic exercises among normal obese subjects has recorded a decrease in waist circumference¹², dynamic muscle loading which helps to increase muscle strength, power and endurance¹³.

A reduction BMI by 1.8kg/m² among subjects is correlates to findings of similar study¹⁹ and 1kg/m² reduction of BMI among obese individuals with resisted exercises and diet. A reduction in waist circumference by 6cms among experimental subjects correlates with 4cms decrease in waist circumference with resisted exercise and diet measures¹⁶.

- § Salient features and uniques of exercises using physio ball.
- § Exercises using physio ball are highly metabolic, hence higher calories are burnt due to co contraction with many muscle groups getting activated with each exercises.
- § Resistance is provided by the subjects body weight with each exercise done with ball
- § Most of the activities are closed kinematic activities increases proprioception of peripheral joints, improved balance, reflex, self care and mobility.
- § Different superior and unique from other forms of aerobic activities or other means of resisted exercises, by eliciting active contraction of the whole extremities bilaterally with each exercises.
- § As the body is fixed on the ball, core muscle activation is strong than done on floor or other gadgets.
- § Dynamic muscle and joint loading with resisted exercises on the ball improves muscle strength, endurance and flexibility.

Reduction in BMI, waist circumference is highly significant as indicated by statistical analysis, is correlating with the findings of another study with reduction in waist circumference.

Waist circumference is a stronger predictor than BMI.Reduction in waist

circumference is noted more among 20 – 40 years of age group than from 40 – 60 years remains further influence of hormonal and other parameters. Influence of drugs on obesity also needs to be studied.

CONCLUSION

Substantial impairment of health and diminished quality of life in people with large waist circumference¹⁸hence resisted exercises with dietary means helps in promoting health and to improve a better quality of life, also reduces the risk of developing metabolic and cardio vascular diseases. India’s public health policy in coming years to be directed towards non-communicable diseases, as infection one’s as worldwide a substantial shift in the risk factors to disease burden from the risk for common diseases in children towards for non-communicable diseases in adults.

REFERENCE:

1. Novak NL, Brownell K.D, Role of policy and government in the obesity endemic circulation, 2012; **126**: 2345-2352.
2. Siedell J,C, Bakker, CJ,Vanderkooy, Imaging technique for measuring adipose tissue distribution. *AMJ of clinical nutrition*, 1994; : 953-957.
3. Must, A, Jacques PF, and Dallal. Long term morbidity and mortality of net weight adolescents. A follow up of the Harvard group study at 1935-1992 *New England J at medicine*:1992; **327**: 1350-1355.
4. Ramachandran, A, snehalatha C, Visvanathan, V, Vishvanathan M, and hattner, S.M. Risk of NI DDM conferred by obesity and central adiposity in different ethnic groups. *Diabetic reference clinical practice*, 1997; , 121-125.
5. Sanjay kinra *et al.* Socio demographic pattern of NCD risk factors in rural India. *British medical journal*, 2010.

6. Gopalan C, Rising incidence of obesity, CAD, Diabetics in the Indian urban middle class. *World RW nutrition diabetes*: 2001; **90**: 127-143.
7. Mohan V, Gokulakrishnan K, Deepa.R, Shanthirani C.S. Datta. M. Association of physical inactivity with metabolic syndrome and CAD. *CUPS-15. Diabetic medicine*: 2005; **22**: 1206-1211.
8. Rewen G, Abbasi.F, MC Laughlin.T. obesity Insulin resistance and cardio vascular diseases. *Recent prog normme Research*, 2004; **59**: 207-223.
9. Hill, J.O, Sparling P.B, and Shields T.W. Effects of exercise and food restriction on body composition in obese women. *American journal of clinical nutrition*, 1987; **46**: 622-630.
10. Lindgreen P, Lindstrom J, Tuomilente and sitnpa.M. *International journal of health care*, 2007; **23**(2) 177-183
11. Stella,L, volpe, Naticobusingye;M.S, Smita, B, Mullr, M.S, and Stanek,E. Effect of diet and exercise on body composition, energy intake in net weight women. *J of A C of nutrition*, 2008; **27**(2) 195-208.
12. Yunkee lee, Yanng whang sang kong. The effects of an exercise programme on anthropometric metabolic and cardio vascular parameters in obese children. *Korean circulation journal*, 2010; **40**(4): 179-184.
13. Levengee P.K and Norkins CC, Joint structure and function. A comprehensive analysis 3rd edition. FA Davis, 2001; Philadelphia.
14. LEAN emj, Han. T.S, Seidell J.C. Impairment of health and quality of life in people with large waist circumference. *Lancet* 1998, **351**: 853-6.
15. Shankuan , zirnianwang, Stanley heskha, moon seang reo, nyles. Faith, waist circumference and obesity. *American journal of clinical nutrition*, 2002, **76**. No: 4743.
16. Ronald, J, Sigal, Glomp. Kenny, Normand. G. George and wells. Effects of aerobic training, resistance training or both on glycemic control in type II diabetes. *Journal of internal medicine*, 2007; **147**(6); 357-423.
17. Ramla A, Martin, marvel, T, verrissino, mameal, J, coelho E, Silva, Sean.P, Ana M. Teireita. The effect of aerobic versus strength based training on high sensitivity reactive protein in older adults. *European journal of appliednphysiology*, 2010; **110**(1); 161-169.
18. Oldayd , NC, winnin, M and white. RCT evaluating the effectiveness of behavioural interventions to modify Cardio vascular risk factors in men and women with impaired glucose tolerance. *Diabetes research and clinical practice* 29-43; 2001.
19. Baik, I, Ascmerio, A, and Rimm, E.B. Adiposity and mortality in men. *American journal of epidemiology*, 2000; **152**: 264-271.