Resisted Exercises Training on Fasting Blood Glucose and Obesity Among Type II Diabetes.

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Abstract:

Resisted exercise training improves glycemic control and decreases obesity among type II diabetic subjects is the core of this study. Fasting blood sugar is widely used as diagnostic criteria in type II diabetes. This research where experimental subjects between 30-60 years of both sex have undergone specific exercises using Physioball, with duration of 12 weeks, 5% drop in waist circumference and fasting blood sugar. As with encouraging results, this RET means can be considered in the comprehensive diabetic management.

Key Words*: WHO- World Health Organisation, FBS – Fasting Blood Sugar, WC – Waist Circumference, AHA – American Heart Association, ACSM – American College of Sports Medicine, AACPR – American association of Cardio Pulmonary Resuscitation, RET – Resisted Exercise Training.*

Introduction:

An increasing prevalence of two major risk factors for cardio vascular diseases, obesity and diabetes are increasing in US (Rosamond 2008) and throughout the developed and developing world (WHO 2008). While cardio vascular diseases accounts for 30% of global deaths (WHO 2008).AHA, ACSM, AACPR have recommended resisted exercises as part of comprehensive exercise programme in the prevention of individuals at high risk for cardio vascular disease (Balady etal 2007). The elevated blood glucose levels and increased obesity observed with these disorders are known to increase the risk of micro vascular and macro vascular complications that can cause a variety of other health issues, from hypertension and blindness to kidney failure and heart disease (Ingelson etal 2007). Effectiveness of RET on reducing obesity and on FBS were the core of this original research. Physioball is used as the tool of resistance of this study.

The importance of maintaining low blood glucose level is evidenced (Kraw etal2001). The majority of people with impaired glucose tolerance or type II diabetes are overweight and for many reasons many are not likely to wake up for endurance training, For these people resistance training probably represents an attractive exercise modality, and this form of training is to be included in the general recommendation for an exercise prescription for patients with type II diabetes (Anderson etal 2003). The objective of this original research study is to analyse the impact of resisted exercises on FBS and obesity among Type II diabetic subjects.

Inclusion Criteria:

Known type II subjects of both sex between 30-60 and on medication.

Exclusion Criteria: Those who have not attended the camp, Type I diabetes.

Materials and Methodology:

Special diabetic camp was conducted in Chennai in May 2010, known type II diabetic of both sex on medication between the age group of 30-60 days, 100 subjects were selected and allotted at random in II Groups Group I- control subjects (n=50), II- Experimental subjects (n=50), while all the participants continued their daily routines and prescribed medications, Group II subjects were assigned with specific exercises using Physioball. A set of 10 exercises were performed with physiotherapists guidance, with a frequency of thrice a week, progression was made with increases in number of repetitions and period of holding (Isometric Contraction). All the subjects fasting blood sugar and waist circumference were recorded twice once at the beginning of the study and 12 weeks after completion. Ethical committee approval and

consent from each subject were obtained. All the subjects have completed the study. No hypoglycaemic incidents were recorded. This whole research study was conducted during the period from 2008-2013.

Results:

Results were tabulated, analyzed and due statistical methods were applied as below:

FBS	Mean		SD	SE	Significance Level
	Pre	Post			
Group I	145	152	3.69	.52	P>.1
Group II	143	138	25	4.57	P<.001
WC					
Group I	95	95	.89	.13	P>.1
Group II	94	89	7.50	1.06	P<.001

Discussion:

1. An increase in insulin action of 23-48% was recorded with light to moderate resistance exercises among type II diabetic subjects (Erikson etal 1998; Ishi etal 1998).Effects of RET among type II diabetic subjects with lowering of FBS was by recorded Castaneda etal 2002 in a 16 Week study has reduced by 10%, In this study FBS has decreased by 5% in 12 week study among resistance exercises group. Baldi etal 2003 in a 10 week study have recorded a reduction fasting glucose level, fasting plasma glucose decrease with RET.

2. This Study with 5% drop in waist circumference among group II Physioball subjects is similar to the published findings (Subramanian and Venkatesan 2014). Weight loss in obese patients can improve dyslipidemia, hypertension, Type II diabetes and left ventricular function; benefits are found with weight loss after 5% initial weight and continue to improve with increasing weight loss (Klein etal 1998).waist circumference has been advocated as an indicator of central obesity (Rankinen etal 1999). Waist circumference rather than BMI agrees with perception of body size, possibly due to its relation with abdominal fat at different ages and could serve better than BMI and skin fold thickness for identifying central adiposity. Waist Circumference may be a strong predictor than BMI for the identification of metabolic and cardiovascular associated risk factors (Shanzhm 2002).

- In a study on obese women using magnetic resonance imaging to measure regional fat loss after exercise and diet intervention. RET induces reductions in visceral adipose tissue (VAT), thus an effective means of reducing obesity (Ross etal 1994). Weight loss is known to improve many of the factors associated with IGT, including insulin sensitivity and glycemic control (ADA 2002).

- In a Meta analysis of controlled trails investigating the effects of physical activities on glycemic control was not associated with weight loss (but the weight loss is through increased energy expenditure (Thomas etal 2006) and increase in muscle mass (Takala etal 1999).

3. Mechanism: several adoptions with RET among Type II diabetes includes increases capillary density and GLUT4 content, a shift towards more insulin sensitive fibre type (Ivy etal 1999). Dela- F etal (1998) have found in patients with type II diabetes undergoing resistance training programme a significant increases in protein kinase and glycogen synthase content in the skeletal muscle. The effect of RET on the whole body was soley attributed to the larger muscle mass (Takala etal 1999).Mechanism Behind Exercises: In a cross sectional study no effect of resistance training on insulin stimulated glucose uptake per kilogram of muscle was found and the positive effect of resistance training on the whole body was soley attributed to the larger muscle mass (YKI. Jarvinen, 1983; Takala etal 1999). RET in the management of diabetes used pneumatic machines and exercise bands. Effects include improved glycemic control, increased levels of adiponectin, these related

effects to improvement in glycemic control may be due to stimulation of muscle contraction, which activities signalling pathways of glucose transport in to the cell (Brooks etal 2007).

4. FBS and waist circumference in Type II Diabetes: High positive association of FBG with waist circumference among obese subjects were recorded by
   cao etal 2008, while obesity were associated with increased risk for type II diabetes (Gomez etal 2008) conversely weight loss was found to be associated with a decrease in insulin concentration and an increase in insulin sensitivity (Santos etal 2009). Treuth etal 1995 have observed significant decrease in VAT in 16 weeks of RET by using dual energy X- ray absorptiometry.

- Fasting blood sugar or OGTT as a diagnostic criteria for diabetes for decades, a cross sectional epidemiological study using FBG criteria set by ADA has shown higher specificity and high negative predictive value among Chinese population (Bao etal 2010).Ramachandran etal 2012 reported higher specificity and only 51% sensitivity for hba_1c as a diagnostic tool for diagnosing type II diabetic in Indian patients. Similar study among American patients by lipscambe 2011 with high specificity and low sensitivity 30% of hba_1c. Racian and ethic variations in hba_1c have been reported to impact the potential utility of hba_1c test (Herman etal 2012). The combination of FBG and hba_1c as biochemical parameters for diagnosing diabetes mellitus is better (Qazi Najeeb etal 2015).

Conclusion:

Reduction in obesity and improved glucose control as recorded with resisted exercises among type II diabetic subjects are effective and can be combined along with structured aerobic exercises in the overall physical activities component of diabetic management.

Limitations of the study include other blood glucose parameters are not studied, lesser sample size and shorter study duration. Further studies including more physical and bio chemical parameters with larger sample size, longer study periods and detraining effects, combining aerobic and resisted exercises for obesity and glycemic control are recommended.

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